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# USSR Report

ENERGY

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ENERGY**

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OIL AND GAS

EDITORIAL MARKS AZSSR OIL INDUSTRY DIRECTION

Baku VYSHKA in Russian 16 Mar 85 p 1

[Editorial: "More Oil for the Motherland!"]

[Text] Oilmen of Azerbaijan have honorably fulfilled their patriotic duty and successfully supplied fuel to the motherland in all stages of socialist construction. Azerbaijan is rightfully called the country's oil academy, for it is precisely at the republic's oil fields that the equipment and procedures involved in development of oil deposits both on land and at sea have been improved, and that new methods of raising the oil output of the beds, procedures for drilling deep wells and many other things came into being.

The fact that the earth's interior is being depleted as the years go by is a fully natural phenomenon. Nonetheless oil and gas extraction industry still occupies a leading place in the republic's economy. The CPSU Central Committee posed an important task before the oilmen of Azerbaijan--stabilizing and achieving an increase in the oil extraction volume. Problems associated with insuring stable operation of oil and gas extraction industry were thoroughly discussed at a recently held republic meeting of active party members and administrators.

As was noted in the speeches, qualitative changes have occurred in recent years in the development of this very old sector. As a result of higher capital investments and greater attention toward oil extraction, development of the deposits of the Apsheron Peninsula and the coastal water basins of the Caspian is proceeding more actively and on a wider front. The republic's oilmen are developing the central and western regions of Azerbaijan, and they have now extended their operations into the great depths of the sea. They are making wider use of the accomplishments of scientific-technical progress, and they are constantly strengthening the sector's material base. All of this has made it possible to significantly reduce the rate of decline of oil extraction and to achieve an increase in raw material reserves. It is pleasant to note that the number of collectives that are completing their planned quotas and that are working stably and productively is constantly growing.

But as was noted at the meeting of active party members, positive changes have not been achieved in all areas: According to the results of the previous year the shortfall in the oil extraction plan was 1.2 percent, and oil and gas

extraction in the republic was lower than the 1983 level. At the same time the republic possesses great potentials not only to stabilize the extraction level but also to insure its growth. Evidence of this can be found in particular in the work being done by oilmen in the final year of the five-year plan. In January-February the oil extraction plan was 100.3 percent completed, the increment in comparison to the same period of last year was 5.6 percent, and the state of affairs in drilling was improved.

What predetermined this success? The efficiency with which the associations are being managed was increased, requirements have been stiffened, and things became more orderly and organized. These positive trends must be consolidated and fulfillment of the quotas for 1985 must be unconditionally provided for. And they are hard quotas. In comparison with last year, 8 percent more oil is to be extracted and drilling volume is to be increased by 20 percent. Successfully reaching these goals is the immediate duty of the republic's oilmen, since this would help to make up for the shortfall that formed in 4 years of the current five-year plan. After all according to the results of the 4 years, 12 of 16 oil and gas extraction administrations were unable to fulfill their established quotas, and drilling was allowed to fall behind as well.

After deeply analyzing the state of affairs in the sector, the participants of the meeting of active party members focused their attention on the shortcomings, the unsolved problems and the bottlenecks. The lag in extraction and drilling that evolved in the present five-year plan, it was emphasized at the meeting, was chiefly the consequence of a low level of administrative and technical leadership, and weak labor, production and executive discipline in many production units.

The meeting of active party members and administrators determined the main directions of work in the future. First of all we must increase the pace of the efforts to outfit new promising deposits such as the Tarsdallar' deposit in Shamkhorskiy Rayon, and new offshore deposits. At the first of these deposits, in almost a year and a half of its development only one well has gone into operation. Good results were achieved at the offshore deposit imeni 28 Aprel'. But sins committed in equipping the deposit are now having their effects here as well: When the extraction volume increased, complications arose with transporting the oil owing to a shortage of pipelines.

Delays in outfitting deposits presently being developed and new deposits can also be explained by the weak work of the construction subdivisions of oil and gas extraction industry. Because of slow erection of oil field facilities, utility lines and roads and slow creation maintenance bases, development of the deposits is being delayed.

Both the Azneft' and Kaspmorneftegazprom associations must develop specific programs of actions to outfit the new areas; these programs must foresee solution of both current and long-range problems.

The next direction of work is further development and exploitation of old areas. Finding optimum well operating conditions and improving the engineering work

involved with overhaul and current repair of operating equipment are all immediate problems of priority importance.

Drilling plays the main role in maintaining and increasing oil and gas extraction volume. There are many shortcomings in this area as well. The drilling plans are systematically unfulfilled. This is explained by shortcomings in management of drilling operations, and by weak labor and production discipline. The accident rate in drilling is high. The fact that 70 percent of the accidents are at the fault of the direct executors speaks for itself.

Much has to be done by scientific institutions to solve the practical problems of oil and gas extraction--ones such as introducing progressive methods of intensifying oil and gas extraction, reducing manual labor at the oil fields and creating new equipment and production procedures.

More attention must be devoted to further development of the sector by enterprises of metallurgy, machine building, petrochemistry and other sectors associated with the work of the oilmen, who are awaiting from them more modern productive equipment and various tools and materials.

The tasks facing the oilmen may be completed only through the coordinated efforts of all ministries, departments, enterprises and organizations associated with the work of oil and gas extraction industry. The meeting of active party members posed concrete tasks concerned with improving work with personnel, and special attention was devoted to solving social and personal problems: construction of housing for oilmen, and improvement of municipal, trade, cultural and personal services.

All of this dictates the need for raising the level of organizational and political work carried out by the city committees and rayon committees of the oil regions, and by primary party organizations.

As with all laborers of Azerbaijan, the republic's oilmen express unanimous support for the decisions of the special CPSU Central Committee Plenum. Discussing the need for achieving a decisive turn in the effort to orient the national economy toward intensive development, in his speech to the plenum CPSU Central Committee general secretary, Comrade M. S. Gorbachev emphasized that we are obligated to attain the foremost scientific-technical positions in short time. This is precisely the task that faces Azerbaijan oilmen today. Faithful to their labor traditions, they promised the Central Committee that they would spare no efforts to improve the state of affairs in the sector, that they will make an honorable contribution to development of the country's fuel and energy complex, and that they will honorably greet the 27th CPSU Congress and the 31st Congress of the Azerbaijan SSR Communist Party.

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OIL AND GAS

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AZSSR'S KURINSKIY BASIN GAS, OIL PROSPECTS OUTLINED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 12, Dec 84 pp 1-5

[Article by F. A. Shirinov, of the Azerbaijan Scientific Research and Planning Institute for the Petroleum Industry: "The Scientific Bases for Oil and Gas Explorations in the Kura and Iori Interfluvian Region", under the rubric "Oil and Gas Field Geology, Exploration and Development"]

[Text] World practice shows us that selecting the most effective direction for petroleum exploration operations depends directly on our ability to determine the location of oil and gas bearing basins, i.e., the main areas of oil and gas formation and accumulation. It has been determined that of the world's known oil and gas reservoirs, over 34,000 are genetically connected with oil and gas bearing basins. In this connection, the procedures for conducting exploratory operations have changed considerably during the last 10-15 years, here as well as abroad: if, during earlier exploratory operations, the main objects of study were local structures or areas where oil and gas accumulations had been suggested by one indication or another, then oil and gas bearing basins have become today's main object of study.

In connection with this, the geological zoning of oil fields, the essence of which consists in determining the positions of the oil and gas bearing basins, and separating them into areas with varying gas and oil bearing characteristics has taken on critical importance. This zoning is usually carried out according to a genetic principle and is based on the organic sedimentary-migrational theory of oil and gas formation in the basins which were developed over a long period of time, and where, over an extended length of time, there occurred intense submersion and accumulation of thick masses of sediments and organic matter, and where favorable conditions were created for their conversion into liquid and gaseous petroleum series hydrocarbons. This is precisely the reason that when promising areas were being zoned, oil and gas bearing basins were used as the basic zoning elements. Oil and gas provinces which unite a group of associated oil and gas bearing basins, the geotectonic position and historical development of which have been controlled by the same extremely large structural element of the earth's crust, are considered zoning elements of the highest rank; after the oil and gas bearing basins, in descending order, are ranked the oil and gas accumulation areas or oil and gas bearing areas, after which come the fields and traps.

Thus, the preparation of the scientific grounds for evaluating the prospects for the oil and gas presence of large areas has come to be based on the results of three types of scientific generalizations: the regional character of the area, which permits the position of oil and gas bearing basins and provinces to be determined; the zonal character, which helps to separate areas of oil and gas accumulation, and the local character, which makes it possible to isolate the traps which accumulate reservoirs of oil and gas.

In developing these scientific bases, the Kurinskiy Basin was also needed in connection with the development of exploratory drilling in its northwestern section.

The need for correlation in the regional program was brought about by the fact that contiguous areas of two republics (Western Azerbaijan and Eastern Georgia) were not counted as an individual sedimentational basin in the geological documents, which is extremely critical in determining zones of oil and gas formation and accumulation, but were described as part of the Kurinskiy intermontane area and the Kurinskiy intermontane trough; their various areas were counted as making up the Upper Kurinskiy trough, the Central Kurinskiy basin, the Adzhar-Trialetskiy area, the eastern submerged Dzirulskiy nose and the Artvin-Bolinskiy subplatform area, or were separated into a series of local troughs.

Previously, along with tectonic and petroleum-geological zoning, certain theoretical questions about the oil and gas geology of the Kurinskiy basin had been examined by a great many researchers. However, development of the scientific bases for exploratory operations in the western part of the basin required a completely different approach and a new regional correlation of the geological-geophysical data on the level of present-day requirements, and with a consequent solution to the problems of regional, zonal and local character.

This research was conducted in the AzNIPIneft' [Azerbaijan State Scientific Research and Planning Institute of the Oil Industry] together with the Azneft' Association's geological service beginning in 1977 using the material from new geological-geophysical data. As a result, a new tectonic zoning map of the Kurinskiy basin was drawn up (Figure 1). This permitted a determination, within the boundaries of the basin, of the position of the main tectonic troughs and the oil and gas bearing basins confined to them [3,4]. In particular, it has been established that the southeastern part of the Kurinskiy basin area is part of the Southern Caspian megabasin, which shows up on land as the Lower Kurinskiy and Gobustan-Ashperonian troughs; further to the east the Yevlakh-Agdzhabedin trough has separated and the presence of the isolated Iori-Adzhinour trough has been established in the extreme northwestern part.

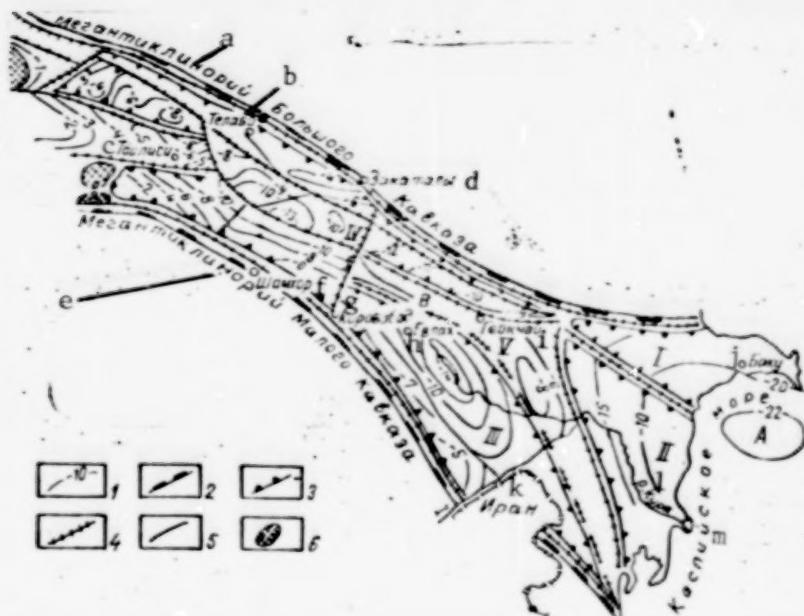


Figure 1. Tectonic zoning chart of the Kurinskiy Trough  
(from A. I. Guseynov and F. A. Shrivinov)

Key: 1--structure contours along the surface of the sub-alpine base, km;  
2,3--boundary of Kurinskiy basin and troughs; 4,5--boundary, and  
other faults; 6--sub-alpine folded base outcropping (this numerical  
designation also used in Figure 2); A, B--Southern Caspian and  
Kurinskiy basins; I, II, III, IV--Gobustano-Apsheronian, Lower  
Kurinskiy, Yevlakh-Agdzhabedin and Iori-Adzhinour troughs, respect-  
ively; V--Kyurdamir-Saatly interbasin area of uplifts; a--megantic-  
linorium of the Major Caucasus; b--Telavi; c--Tbilisi; d--Zakataly;  
e--meganticlinoria of the Minor Caucasus; f--Shamkhor; g--Kirovabad;  
h--Yevlakh; i--Geokchau; j--Baku; k--Iran; l--Kura River;  
m--Caspian Sea

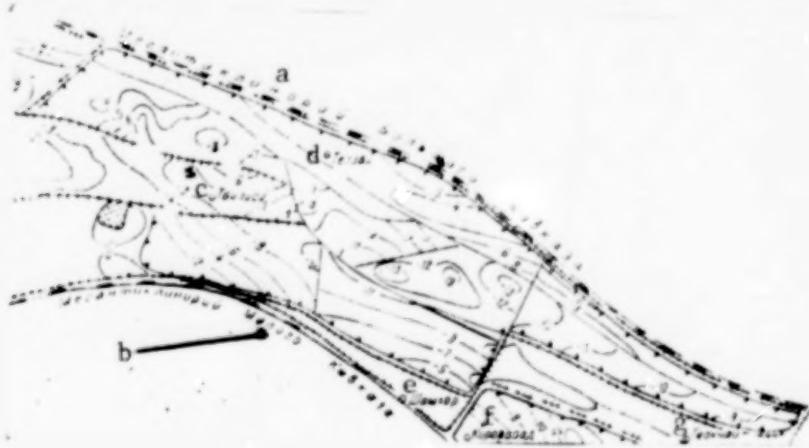


Figure 2. Tectonic zoning chart of the Iori-Adzhinour trough (A. N. Gus-  
eynov and F. A. Shirinov)

Key: 1--axial line of the Kyurdamir-Saatly interbasin uplift zone; a--Major  
Caucasus meganticlinorium; b--Minor Caucasus meganticlinorium; c--Tbi-  
lisi; d--Telavi; e--Shamkhor; f--Kirovabad; g--Geokchau

Thus, it has been established that the contiguous regions of Eastern Georgia and Western Azerbaijan are part of the unified Iori-Adzhinour tectonic trough (Figure 2) which occupies over 30,000 km<sup>2</sup> of territory and which is delimited on the north, south and west respectively by the meganticlinoria of the Major and Minor Caucasus and Dzirul-Khram-Lokskiy segment of the Transcaucasus area of the transverse uplifts. Southeast of the Yevlakh-Agdzhabedin trough it is divided by a zone of buried uplifts within the Mingechaur-Saatly belt and by the Shamkhor projection.

It has been further established that during the Mesozoic age of geologic development the territory of the Iori-Adzhinour trough was, from time to time, an integral part of the Transcaucasian median mass and served as a washout area, and at times became part of the Major and Minor Caucasus geosynclines and the Transcaucasian median mass which separated them, and simultaneously acted as an area of denudation and accumulation [1,2,5,8]; as an independent trough and sedimentation structure this territory began to be isolated during the Paleocene, and later during several geologic ages of the Cenozoic, was subjected to intensive and steady warping, where during stable conditions there occurred an accumulation of sedimentary strata many kilometers thick [6]. The indicated geotectonic developmental behaviour was responsible for the favorable conditions for accumulating and burying the organic material and converting it into liquid and gaseous hydrocarbons. Specifically, these conditions existed during the period of sedimentary accumulation of the Eocene, the Maykopskiy suite, the Sarmatian stage and the Shirakian section [7], which has been proven by the results of geochemical research and has been corroborated by the regional oil and gas content of these stratigraphic intervals within the Iori-Adzhinour trough.

Thus, the analysis and correlation of the geological-geophysical data, and the development of the tectonic, historico-geological, lithologic-facial, geochemical, hydrochemical and hydrogeological criteria of the regional level have permitted us to single out the Iori-Adzhinour sedimentation trough as an individual oil and gas bearing basin where, during the Cenozoic era there existed an autonomous system for realizing the processes of hydrocarbon generation, accumulation and conservation.

The correlation of these data within the zonal plan has already shown that the interfluvial zone between the Kura and the Iori rivers is an integral part of the Iori-Adzhinour oil and gas bearing basin and comprises one of its oil and gas accumulation zones. In the geological section, all the oil and gas bearing suites have been determined within the basin, with the single difference that some of the suites show up as having complete stratigraphic capacity, and are characterized by favorable lithological-facial and structural-tectonic features, others have not developed to their full capacity, and have a comparatively argillaceous profile and are not located in favorable structural-tectonic conditions, and the third group occupies an interfluvian locus. The presence of collecting strata capable of providing for the migration of hydrocarbons into traps has been fixed within the cross-section of all the suites. In the geological cross-section of the region's Cenozoic complex of deposits, regionally persistent and reliable oil-, gas-, and water-resisting

strata have been detected, which prevent the dispersion of the hydrocarbons as they migrate and are conserved. This gives grounds for all the oil and gas accumulations within the Kura-Iori interfluve, both known and possible, to connect up with the Iori-Adzhinour oil and gas basin. The Adzhinour oil and gas region has also been found to be within the sphere of influence of this oil and gas basin in Azerbaijan.

While evaluating the prospects for the presence of oil and gas, it has come to light that there is an Eocene complex of deposits located in the Kura-Iori interfluve, in more favorable facial and tectonic conditions. This complex should be used as the primary formation for exploratory drilling.

The prospects for the presence of oil and gas in the Maykop suite and Sarmatian stage deposits have also been evaluated as positive. But insufficient study of these deposits precludes their being recommended at present as separate objects of exploration. The oil and gas presence of these deposits should be studied and verified concurrently with the exploratory drilling of the Eocene strata. This will provide information for an evaluation of the prospects for oil and gas presence in various sections of the area, after which the above-mentioned oil and gas bearing complexes can be treated as a separate object of exploratory drilling.

The development of the Shirakian suite deposits is severely limited in the area's extreme northeastern sections, and form part of the exposed sections of the folds. They are of no interest as an object of oil exploration.

Concerning the question of exploratory operations in the local oil and gas reservoir structures, we note that, on the basis of results of correlations which have been made, the Eocene complex of deposits has been singled out as a primary oil exploration target. The favorable nature of their lithofacial characteristics serve as the justification for this, as do the presence in the cross-section of collecting strata, regionally consistent cap rocks, their regional oil and gas presence etc.

In this connection, a need has arisen for a study of the structural features of the Eocene deposits, and this has brought about the development of a complex of geophysical investigations in the area. As a result of investigations along the Middle Eocene seismic horizon (SG-III) about 20 local structures have been detected and the incongruity of the upper structural stages has been proven.

On the basis of scientific principles which have been developed, and recently obtained geologic and geophysical data, an adjustment has been made in the selection of ensuing trends for conducting exploratory operations in the Kura-Iori interfluve. Specifically, drilling operations were also begun in the area's extreme eastern part, which led to the discovery of the Tarsdallyar Field.

Without exception, all the structures discovered through geophysical research along SG-III will be of interest as a separate objective for exploratory drilling. What specifically touches upon the sequence of these efforts is that they should be developed on structures associated with the Tarsdallyar and Damirtepe-Udabno structures, proceeding in a direction opposite to the center of the area. Here, preference should be given to the adjacent structures of the Greater and Lesser Palantekyan, the East and West Gyurzundag etc., where the Eocene deposits are in favorable lithological-facial conditions, and occur at depths which are accessible by drilling.

Without waiting for the results of geophysical research from the first exploratory wells, drilling should commence on the group of folds (the Osnovnaya-Bozdag, Babayeldag, Western Babayeldag, Kaladag and the Karasakkal), which are adjacent to Tarsdallyar and east of Bozdag, and which already find distribution on the territory of the neighboring Kirovabad oil and gas region, where Eocene deposits have also been found in favorable lithofacial conditions.

The selection of further directions for exploratory-prospecting efforts in the Kura-Iori interfluvian region should be made depending on the results obtained in the indicated areas.

Explorations of the oil and gas reservoirs in the section of the Mesozoic deposits of the area is a special problem. A study of the Iori-Adzhinour trough's developmental history has indicated the absence of a separate sedimentation basin for the accumulation of Mesozoic age sediments on its territory. Consequently, there is no basis as yet to assume the existence of favorable conditions, wherein thick strata of sediments might have accumulated, or organic matter might have been stored in the area of the trough during Mesozoic time.

Proceeding from this, the Mesozoic complex of deposits in the Kura-Iori interfluvian region should be grouped with those complexes which are potentially oil and gas bearing; to evaluate their prospects for oil and gas presence, special regional geological-geophysical research needs to be carried out for the purpose of detecting a potential oil and gas bearing basin and the main oil and gas formation areas, the determination, within the cross-section, of the oil and gas bearing complexes and their regionally consistent surfaces, for the evaluation of the potential possibilities of each oil and gas bearing complex which is discovered, the determination of the positions of possible oil and gas accumulation zones for each complex which is discovered, the prediction of directions for exploratory-prospecting efforts, etc.

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OIL AND GAS

SUPERDEEP WELLS SUNK USING LBT-147 DRILL PIPE

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 1, Jan 85 pp 20-23

[Article by A.K. Babayev, Saatlinskaya NRE [not further identified], Azneft' Production Association: "Experimental Drilling of Superdeep Wells Using LBT-147 Drill Pipe"]

[Text] Aluminum drill pipe has been widely used in the last few years in drilling superdeep wells. The 6,806-meter deep Aralsor well in Kazakhstan, the 7,525-meter deep Shevchenko Well No. 1, the Kol'skaya SG-3 well exceeding 11,000 meters and others have been successfully drilled in the Soviet Union using light-alloy drill pipe (LBT).

Experimental drilling of superdeep wells in the Azerbaidzhan and other parts of the country show that as depth increases, the need arises for tapered drill strings. The decreasing well bore necessitates smaller size drill pipe, which in turn increases hydraulic losses and complicates drilling with a turbine bit.<sup>1</sup>

In one superdeep well, the Azneft' Production Association successfully began using light-weight drill pipe at a depth of 5265 m instead of TBVK-140 steel drill pipe previously used (grade L steel and wall thickness of 11 mm). For the purposes of determining the efficacy of light-weight drill pipe, calculations were performed to determine additional tensile load which could be applied to the drill string in an emergency situation, using both steel and aluminum drill pipe. The weight of the drill string in mud is determined by the following formula:

$$Q = qL \left( 1 - \frac{\gamma_{\text{mud}}}{\gamma_{\text{steel}}} \right) \quad (1)$$

Where L is the length of the drill string in meters; q is the weight per linear meter of pipe in kg/m  $\gamma_{\text{mud}}$  and  $\gamma_{\text{steel}}$  represent the density of the drilling fluid and pipe material in kg/m<sup>3</sup>, respectively.

In these calculations, the following initial data were used:

for TBVK-140 steel drill pipe,  $L = 5265 \text{ m}$ ;  $q = 39.7 \text{ kg/m}$ ;

$\gamma_{\text{mud}} = 1240 \text{ kg/m}^3$  and  $\gamma_{\text{steel}} = 7850 \text{ kg/m}^3$ ; for LBT-147 aluminum drill pipe made of D16T alloys with a wall thickness of 11 mm,  $L = 5265 \text{ m}$ ;  $q = 16.5 \text{ kg/m}$ ;  $\gamma_{\text{mud}} = 1240 \text{ kg/m}^3$  and  $\gamma_{\text{Al}} = 3300 \text{ kg/m}^3$  (the density of aluminum drill pipe includes tool joints).

In both cases, the weight of the drill-bit assembly was 13,000 kg.

The additional tensile load which can be placed on the drill string in emergencies was determined by the formula

$$\Delta Q = Q_2 - Q_1 \quad (2)$$

where  $Q_2$  is the emergency tensile load in metric tons and  $Q_1$  is the weight of the drill string in metric tons, including the drill-bit assembly.

Substituting these initial data into equation (1),  $Q_1$  turns out to be 176 metric tons for TBVK-140 x 11-mm steel drill pipe and 54 metric tons for LBT-147 x 11-mm aluminum drill pipe.

Of the technical specifications for drill pipe,  $Q_2$  is determined to be 2842 kN for TBVK-140 x 11-mm steel drill pipe and 1911 kN for LBT-147 x 11-mm aluminum drill pipe.

Then substituting  $Q_1$  and  $Q_2$  in equation (2), it turns out that  $\Delta Q$  for steel drill pipe is 114 metric tons and  $\Delta Q$  for aluminum drill pipe is 141 metric tons.

If 1500 m of steel drill pipe is hung from the hanger in the top string of drill pipe,  $Q_1 = 39$  metric tons.  $\Delta Q$  for aluminum drill pipe is 156 metric tons.

The difference between the tensile loads can thus be increased:

$$Q_{\text{Al}} - Q_{\text{steel}} = 42 \text{ metric tons}$$

The coefficient indicating the advantage of aluminum drill pipe in emergencies is 156/114 or 1.36.

Not only does the use of LBT drill pipe improve the wearability of certain rig components, since the systematic load on the block and tackle, derrick, hoist and hoist transmission is reduced, it also increases the tensile load which can be applied in emergencies.

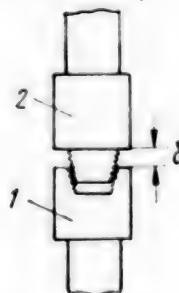
As is well known, LBT drill pipe is manufactured with and without protective thicker reinforced sections. The protective thicker section

protects the body of the pipe from abrasive wear during drilling and also reduces the bending load, since the clearance between the well bore and the thicker section of the pipe is reduced. However, pipe of this design is not recommended when using an ASP-6 for changing the bit because of the thicker section in the middle of LBT drill pipe. In order to use an ASP-6 to run and pull LBT drill pipe, three types of combination pipe stands were used:

1. Two bottom joints of LBT-147 pipe with protective reinforcement and one joint of steel TBVK-140 drill pipe on top,
2. Two bottom joints of LBT-147 pipe with protective reinforcement, and a joint of steel LBT-147 drill pipe on top without protective reinforcement.
3. All three joints of LBT-147 drill pipe without protective reinforcement.

The LBT-147 drill pipe was examined for wear during drilling. It is known that the basic factors determining the rate of wear are drill pipe friction while rotating, axial movements against the well bore while running and pulling, and wear due to abrasive cuttings and particles of weight additives contained in the drilling fluid.<sup>2</sup>

However, experience in drilling superdeep wells shows that the factors just listed are not the main ones. It has been determined for all practical purposes that wellhead equipment used during running and pulling operations wears the drill pipe considerably; the outside diameter of the collars is worn during the make-up and break-out of drill pipe with AKB-3M tongs; the thread connections wear during make-up and break-out of the stands due to their own weight. Weight is a greater factor when the rig is equipped with an ASP-3M. For steel drilling pipe in stands 36 to 37 meters long, the weight of the stand is about 1.5 metric tons. If the tackle system has an automatic elevator, this weight is transmitted to the threaded connections.



1. Box      2. Nipple

To determine the extent of thread wear on the rig, the clearance between the ends of the tool joints was measured (see figure). In the new pipe, the clearance was measured at 38 to 42 mm. Over the course of operations, clearance between the tool joints was allowed to fall to 24 to 26 mm. Experience in using the pipe has shown that the narrower clearance with TBVK-140 drill pipe is reached after 120-130 make-ups (make-up and break-out of the pipe is considered a complete make-up). Thus after 120-130 make-ups, working connections become unworkable and are laid aside in stands. Each new connection will also last for 120-130 make-ups. Therefore, since there are three threaded connections in a stand, each stand is changed out three times. As a result, the total life of the drill pipe is 360-390 make-ups. After this, all pipe is replaced with new.

In the case of LBT drill pipe, the weight of a stand is reduced by a factor of almost 2.5, which doubles the service life in terms of the number of make-ups.

The nature of pipe wear when slips are used is particularly interesting. Performing running and pulling operations with an ASP-6 unit, AKB tongs, and a PKR requires landing the drill pipe string on the slips in such a way that the box connections of the stand are gripped in the jaws of the AKB tongs. At that point, the connection is 1.4 m above the slip rotary. If slips half a meter long are used, the distance between the connection and the lower end of the tongs (when closed) is as much as 1.9 m. Considering that LBT drill pipe is manufactured with a 1.3-m long collar, the tongs grip part of the non-reinforced body when a PKR is used, which causes excessive pipe wear.

It should be pointed out that in drilling the superdeep well, surface corrosion and scouring of LBT drill pipe was not observed. As the well was drilled, the drilling fluid was treated by the addition of chemicals, abrasive weight additives and corrosive agents (caustic soda, KSSB [not further identified], bichromate and metas [as printed]. Barite was used as the weight additive. The parameters of the drilling fluid were as follows: density, 1240 kg/m<sup>3</sup>; temperature, 40-50° C; water loss, 7-9 cm<sup>3</sup>/30 minutes and pH was 9.0 max. Drilling fluid consumption and pressure in the standpipe were 28-32 liters per second and 22-23 MPa, respectively.

A turbine drill was used. The drill string was rotated by the rotary at  $(8...10) \cdot 1.66 \cdot 10^{-2}$  per second.

There were 331 make-ups between 5265 and 7565 meters; drilling time and bit-changing time totaled 4820 hours and 4506 hours, respectively. After the drilling bit had been operating for approximately 4,500,000 meters, the necessary measurements were taken, it was thoroughly checked and replaced as no longer serviceable.

Research revealed the following:

The pipe surface was uniformly worn .5-1 mm and there were numerous scratches from large and abrasive rock cuttings in the annulus;

The outside surface of the connections where the AKB-3M tongs gripped the pipe was worn along the entire length of the connection (178-mm tool joints were worn down to 172 mm and 172-mm joints were worn to 166 mm);

Clearance between the ends ( $\delta$ ) of the tool joints (box and pin) was 24-26 mm with the nipple inserted but not made up; and

Wall thickness at the point gripped by the slips showed 1-1.5 mm wear.

As this experiment showed, the use of LBT pipe to drill superdeep wells considerably improves technology and penetration rates by reducing bit tripping time.

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OIL AND GAS

SEISMIC PROSPECTING DURING DRILLING PROCESS VIEWED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 1, Jan 85 pp 7-9

[Article by M. B. Aliyev, T.N. Gasanova (Southern All-Union Scientific Research Institute for Geophysics) and V. N. Rukavitsyn (All-Union Scientific-Technical Research Institute for Nuclear Geophysics and Geochemistry): "Downhole Seismoacoustic Research during the Drilling Process"]

[Text] The downhole acoustic research method plays no small role in the study of the physical properties of rock penetrated by a well drilled into a natural deposit.<sup>1</sup>

In order to apply this method, it is necessary to develop equipment with improved high-temperature and high-pressure resistance and cables and shut down drilling operations, which entails considerable expense and great delay in completing drilling operations on schedule.

Thus the need is obvious to develop new methods and equipment for analyzing wells without downhole cables and equipment that can be done during the drilling process itself.

With this goal in mind, a drilling parameter analyzer (DPA) has been developed and a downhole research method has been worked out.<sup>2</sup>

The essence of the acoustical well research in-drilling method consists of the recording and analysis of elastic waves generated by the rotation of the bit and transmitted to the surface along the drill pipe string and through the surrounding rock. A diagram of this downhole seismoacoustical in-drilling measuring method is given in Fig. 1.

The equipment is installed as follows:

The Channel 1 sensor (3) is installed on the swivel or the kelly; the Channel 2 sensor (4) is set up in an observation hole; the electronic DPA unit (5) and automatic recorder (6) are installed near the drilling operator's control panel.

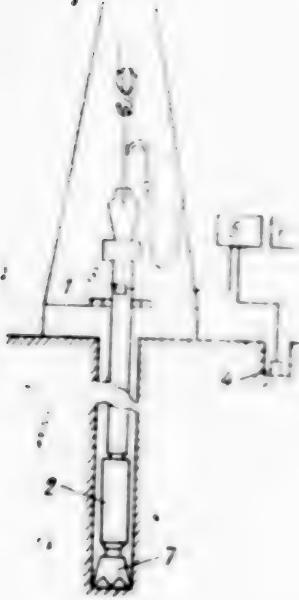


Fig. 1

The sensors are connected to the electronic unit with connections labeled Input, Channel 1 and Channel 2.

The automatic recorder is connected to the electronic unit with a cable running from the output of the electronic unit to the inputs of the automatic recorder.

The electronic unit and the automatic recorder are plugged in to 220+20-volt 50+2-Hz current.

The operation of the electronic unit and the automatic recorder were tested per instructions.

The principle of operation of seismoacoustic logging using a turbodrill (2) is based on the fact that elastic waves generated by the destruction of rock by the bit (7) are transmitted along the drill string (1) and through the rock. These waves are picked up by sensors on the drill string and in an observation hole, transmitted to the drilling parameter analyzer and recorder where the wave patterns are registered as curves.

The raw data thus obtained are interpreted by comparison with GIS [not further identified] data and the nature of the variation in the physical parameters of the rock in the natural deposit is determined.

Raw data are recorded on charts as a function of depth. To correlate changes in the parameters with depth, the depthmeter from the gas logging unit is used whenever possible. If no gas logging unit is available, raw data is processed on a computer using an "Atlas-4," and the well profile is sectioned as a function of the nature of changes in the physical parameters with depth.

This equipment and method was tested in exploratory fields in deep wells in Mangyshlak and the Azerbaizhan directly during the drilling process. Analysis of data showed that use of DPA equipment solves a series of problems: control of the drilling process; regulating drill bit RPM, axial loading, profile sectioning, and the identification of potential producing zones.

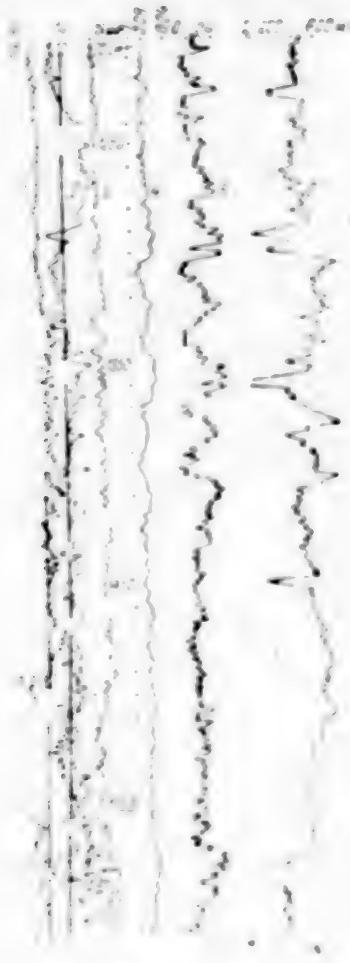


Fig. 2

Fig. 2 shows acoustic research results in Well No. 1260 in the Khanagya Field obtained during drilling as compared to other GIS data, including  $\Delta T$  as measured by a wide-band low-frequency Zvuk-2 device.

As shown in Fig. 2, in-drilling acoustic logging data, i.e. frequency (4) and amplitude (5) of the signals are confirmed by conventional acoustic logging  $\Delta T$  data (6). In addition, when these data are compared with resistivity curve data (1), spontaneous potential data (3) and DS [not further identified] data (2), the potential for the application of the in-drilling acoustical logging method for profile sectioning and the identification of producing zones becomes obvious.

For example, reservoir traps are clearly identified at 1300-1350 m, 1370-1400 m and 1440-1510 m, where high  $\Delta T$  values and low (absorbed) signal amplitudes are noted, which are characteristic for such reservoirs. It is true that certain anomalies have been noted in these parameters. This will require more detailed analysis of the operations performed and further refinement of the in-drilling acoustical logging method.

This work and analysis of the data obtained show that DPA-type equipment is needed in drilling operations to control technology and increase the rate of penetration obtained by current methods<sup>2</sup>. In addition, in-drilling acoustic logging data facilitate the identification of producing zones.

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OIL AND GAS

MECHANIZATION, POWER SUPPLY FOR CASPIAN OFFSHORE DRILLING

Moscow PRAVDA in Russian 20 Feb 85 p 1

[Article by correspondent L. Tairov: "Floating Islands"]

[Text] The attention of visitors to the Exhibition of the Achievements of the USSR National Economy is attracted to a model of an offshore deep-sea platform for drilling a cluster of oil and oil-gas wells. It consists of three tiers and several cranes with a lifting capacity of 12 tons each. There is a helicopter landing pad-equipped living compound for the personnel. All production equipment is installed as modular blocks. The reserves of materials, piping and water are intended for up to 20 days of independent operation.

And on the Caspian at the new deposit imeni 28 Aprel', the model seen at the exhibition has already been embodied into a metallic island. It was built on the basis of new production procedures--using buoyant blocks. Their low displacement--just 2 meters--made it possible to assemble the structures at an assembly site and lower them into the water ready-made on inclined tracks. Nor were special watercraft necessary to install the structures on the floor of the sea. Twenty-four wells are to be drilled from this foundation. Here is what the persons who created the new structure and those who are working on it have to say about it.

F. Dun'yamaliyev, builder: "In former times we had to assemble such platforms at sea one component at a time: We had to install up to 12 blocks and intermediate sections, and lay the decking. The equipment was delivered 'in bits and pieces.' Now the supporting blocks are delivered to us ready-made. The work has become significantly faster and easier."

A. Mageramov, driller: "A mechanical method for preparing drilling mud alleviated us of the most laborious operation: We used to have to use shovels for that. We are also pleased with the platform's reliability."

E. Allaverdiyev, operator: "The platform is well mechanized. Manual operations have been eliminated. During bad weather we can monitor the work of a well without going outdoors. Fire and accident prevention is fully organized. This is especially important--after all, over 300 days of the year are windy on the Caspian, and stormy weather makes up almost half of this time."

The Caspian Sea has long been a vast proving ground for testing modern oil extraction techniques, equipment and technology. Recommendations developed here are being used successfully on the shelves of the seas and oceans. The principal "supplier" of the innovations is the Gipromorneftegaz, the scientific research and planning institute to which the platform model being exhibited at the Exhibition of the Achievements of the USSR National Economy belongs.

"Soon we will replace that model with an improved one," said institute director A Dzhafarov. Azerbaijani oilmen at the deposit imeni 28 Aprel' are now working at sea depths over a hundred meters. This is the limiting depth at which a transition must made from multiple-block to single-block structures, which would greatly reduce the amount of assembly that must be carried out at sea, and decrease its time and cost. A deep-sea platform being built as a single block on the basis of our plans weighs up to 3,800 tons. The Institute of Electric Welding imeni Ye. O. Paton has developed an automatic welder in order to hasten the work of joining the piles together. A barge with a revolving launching unit will transport the giant structures."

Supplying power is one of the important problems associated with developing deep-sea oil and gas deposits. Experience has shown that centralized electric power supply is the most sure way to solve this problem. A steam turbine power plant which uses by-product gas as fuel has been operating at the famous Neftyanyye Kamni for over 30 years. Construction of such facilities has been started at the deposit imeni 28 Aprel' on the basis of plans drawn up by the Gipromorneftegaz. The system will include a regional substation on land and a power plant at Neftyanyye Kamni. The total length of the power transmission lines will be about 200 kilometers, including underwater lines and cable lines.

Fully enclosed substations have been developed and are being built for the first time. This will make it possible to significantly weaken the adverse effects of the marine environment upon insulators. One of the substations will be erected on shore and then transported to deeper waters. Assembly into large blocks in plant conditions will raise the quality and reduce the time of assembly and insure reliable operation of the power system.

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OIL AND GAS

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FORECASTING THE WATER CONTENT OF MEDVEZH'YE FIELD

Moscow GAZOVAYA PRIMYSHLENNOST' in Russian No 2, Feb 85 pp 20-21

[Article by L. S. Temin, All-Union Scientific Research Institute of Natural Gas: "Prediction of Flooding of Medvezh'ye Field"]

[Text] Prediction of the ascent of gas-water surfaces based on a series of observations made over a period of many years in different sections of a deposit makes it possible to assess, with a certain degree of accuracy, the period of water-free exploitation and the time that well flooding would begin. This provides a possibility for prompt initiation of measures to maintain the planned level of gas extraction in the face of the predicted shut-down of a number of wells because of their flooding.

Our country's principal gas reserves are concentrated in Senoman deposits in the north of Tyumen Oblast, the pay section of which has a practically identical structure throughout this entire region. A distinguishing feature of the pay section is its high sand content, attaining 65-70 percent and higher.

The uneven distribution of sandstone and its high concentration in cross section resulted in formation of isolated gas reservoirs which should be categorized as sub-block in terms of their developmental features. This makes it possible to work them more or less uniformly both in area and in cross section.

The system for developing Senoman deposits foresees locating wells close together within the confines of the crests of the structures. In the case of linearly extended tectonic forms, wells are located along the crests of the anticlinal folds, where the maximum capacities are developed for gas saturation of the pay section (the Medvezh'ye and Urengoy fields).

Such arrangement of wells in linearly extended gas-bearing areas represents a drainage gallery which separates the gas reserves of the limb zones into two frequently uneven parts. This is associated not only with the asymmetrical nature of the structure but also with insufficient exploration of its peripheral areas.

The reservoir pressure depression cone arising in the course of development within the zone in which the wells are located has an identical influence

upon the gas reserves of different volumes contained within the limb zones. And if in any part of the zone the gas reserves turn out to be limited, it is here that reservoir water begins to encroach primarily.

The principal factors predetermining encroachment of reservoir waters into a deposit is the magnitude of the decline in reservoir pressure, which depends on the size of the drained reserves in the given sections and the lithological features of the reservoirs.

In the practice of developing the Medvezh'ye and Urengoy fields, information on encroachment of reservoir water into the deposit is obtained primarily from observation wells drilled specially for this, where the location of the gas-water surface is systematically monitored by means of geophysical gas field studies. Such wells are located both within the exploited field (in well clusters as a rule) and in the peripheral parts of the deposit. One-time data on change in the initial position of the gas-water surface are often recorded by production wells.

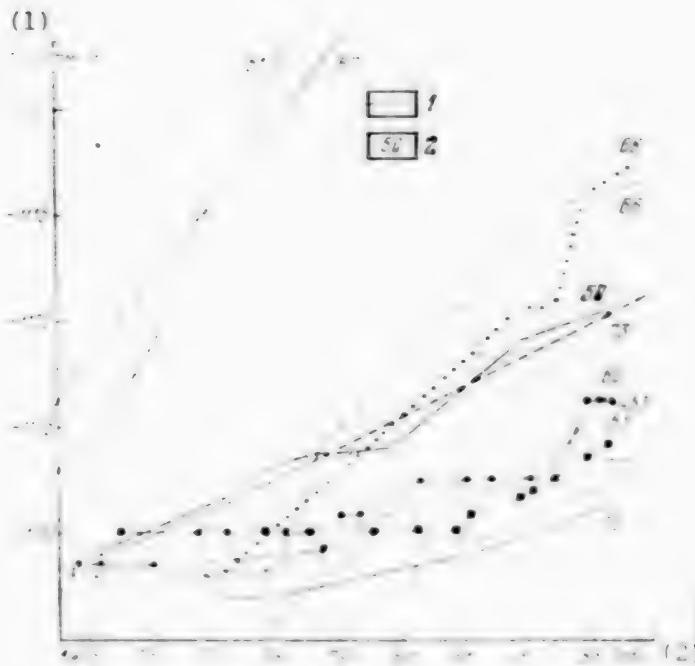
The greatest quantity of data on encroachment of reservoir waters into the deposit of the Medvezh'ye field was accumulated from the southern and central domes. It follows from these data that zones exhibiting the highest ascent of the gas-water surface coincide in general terms with zones of maximum declines in reservoir pressure. Thus within the confines of the southern dome, where as a result of exploitation the minimum reservoir pressures came into being in the vicinity of wells of UKPG [complex gas treatment plant]-2 and -3, wells 51 and 67 recorded the greatest movement of the gas-water surface--its ascent was almost 40 m (as of 1 January 1984).

A second but smaller center of encroachment of reservoir water is situated in the vicinity of wells of UKPG-6 and -7, where a deep reservoir pressure depression cone has formed as well. On the date of comparison the ascent of the gas-water surface attained almost 20 m according to information from wells 66 and 68.

The formation and topography of reservoir pressure depression cones depend on the relative amount of gas extracted from the given section of the field--that is, on the ratio of total extraction to reserves undergoing dewatering.

It should be noted in this case that the depth of the cones is not rigidly associated with total gas extraction inasmuch as it is smoothed owing to drainage of gas from them and encroachment of reservoir water. This pertains especially to the deepest of them (UKPG-2 and -3 and UKPG-6 and -7) where these processes are the most intensive, embracing not only the limb zone but also fields undergoing exploitation to the north and south of the area; these zones are distinguished by higher reservoir pressure. Judging from a series of isobar maps, drainage of gas into the regions in which wells of the UKPG-2 are located, and subsequently to wells of the UKPG-3, proceeds from the very beginning of development and has continued until the present.

The ideas presented here on more-intensive encroachment of reservoir waters in the zone of maximum pressure decline are clearly illustrated by graphs showing ascent of gas-water surfaces in a number of wells (see Figure).



Dynamics of Ascent of the Gas-Water Surface in Observation  
Wells: 1--predicted ascent of gas-water surface (using well  
50 as an example); 2--well

Key:

- |                              |         |
|------------------------------|---------|
| 1. Height above sea level, m | 2. Year |
|------------------------------|---------|

It is evident from these graphs that on a given date of comparison the extent to which the gas-water surface rises differs significantly, but that this difference does not have a direct relationship to stage-by-stage development of a field. Of course gradual development of gas-bearing sections of the field from south to north brings on corresponding (in time) encroachment of reservoir water into the field. However, the scale of this process is subordinated primarily to the dependence of total extraction from individual sections on their drained reserves.

It should be noted in this case that the greatest ascent of the gas-water surface, observed in the eastern part of the zone in which wells of the UKPG-2 and -3 are located (wells 51, 67), is the product of limited gas reserves in the eastern limb of the field's southern dome. In correspondence with the orientation of the axial zone of the structure of the Medvezh'ye anticlinal fold (the region of strata with maximum gas saturation), the gallery of UKPG-2 and -3 wells turned out to be shifted eastward. As a result of this, the gas reserves in the western limb are over twice the reserves in the eastern limb.

A high rate of encroachment of reservoir water at the eastern limb of the vicinity of UKPG-2 and -3 wells is indirectly confirmed by the more-intensive

decline of static levels of reservoir water in wells 15 and 51 in comparison with the western limb (well 6).

Given the established gas extraction rate by wells of individual UKPGs, the rate of encroachment of reservoir water into the field should either remain the same or increase somewhat due to growth of the difference in pressures between the water pressure source and the gas field--that is, patterns of flooding of individual sections of the gas-bearing area that had established themselves in the course of a number of years of exploitation should persist.

This circumstance opens the possibility for predicting the scale and nature of the field's flooding. Only significant redistribution of the rates of gas extraction among the UKPGs may disturb the revealed patterns, which in this case could be subjected to correction.

Of interest is the fact that in some observation wells, ascent of the gas-water surface began following a relatively long period of exploitation of the sections in which they are located (wells 65, 453 and others). This is explained by the large reserves of gas contained in these sections and correspondingly by slower formation of a depression cone. Zone of large reserves are also distinguished as a rule by large gas-bearing areas, in connection with which the depression cone has a less-concentrated influence upon the water pressure system.

On the other hand ascent of the gas-water surface in a number of wells begins practically immediately after the exploitation of the section begins (wells 51, 67, 68, 73), which is associated with the good reservoir properties of the pay section within the zone of initial location of the water-gas interface.

Continual ascent of the gas-water surface in the course of time is interrupted in some wells by periods of no ascent lasting from 0.5 to 2 years, which are reflected in the graphs (see Figure) by corresponding horizontal segments (wells 453, 68, 50). This is associated with the fact that the profile contains impermeable lens-like shields: It takes water a certain amount of time to get around them. In this case the larger the shields in area and thickness, the more time is required for flooding of the pay section above the shield.

The empirical laws that have been established in relation to ascent of the gas-water surface in wells in different sections of the field make it possible to plot current and prognostic maps of the field's flooding on particular dates of development. Current maps may be used to estimate the volume of encroachment of reservoir water in the preceding time of the field's exploitation, which is extremely important when it comes to calculating and correcting the figures for the initial and remaining gas reserves when various methods are used to reduce reservoir pressure, in conditions where the relationship between the gas deposit and the water pressure system is violated. All other estimates of the water encroachment volume are based on conditional theoretical premises. In particular this pertains to determining the average permeability of the water-bearing and gas-bearing parts of the pay section, errors in estimating which could lead to great errors in determining the reserves and making the corresponding predictions for development.

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OIL AND GAS

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METHOD FOR LOGGING WATER-BEARING GAS FIELDS OUTLINED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 85 pp 23-24

[Article by S. N. Zakirov, A. N. Timashev, O. M. Sevast'yanov and V. I. Akhapkin, Moscow Institute of Petrochemical and Gas Industry imeni I. M. Gubkin, and VolgoUralNIPIGaz, Ministry of Gas Industry: "Deep Logging of a Water-Bearing Basin in the Course of Field Development"]

[Text] The method proposed here for monitoring development of a gas deposit makes it possible to establish the structural type of reservoirs in a water-bearing basin, to obtain a quantitative description of how easily the water-bearing basin could be drained at different moments in time and, on this basis, to carry out reliable prognostic calculations, based on gas and water dynamics, of the amount of water encroachment in the deposit, the flooding time and the number of production wells that undergo flooding. Knowing the real scale of a field's flooding, we can promptly make corrections in the system of its development and take the necessary steps to control well flooding with the purpose of extracting the maximum quantity of gas and condensate from the interior.

Floating gas accumulations of the Medvezh'ye, Urengoy and Orenburg fields, which contain large quantities of gas and which are typified by underlying water-bearing formations, are now presently in exploitation. These accumulations are distinguished by reservoirs with a stratal-block structure--that is, they are characterized by stratified heterogeneity of the pay section in terms of reservoir properties, and by presence of gas-saturated formations related to each other and with lower-lying water-bearing formations, including ones which are not in the gas-bearing area, by gas and water dynamics. The flooding mechanism in such deposits is much more complex than that of stratal or block deposits.

Stratal-block floating deposits are simultaneously flooded in two ways. The first is the same as for stratal deposits. The second involves vertical or nearly vertical encroachment by bottom water from water-bearing stringers not within the gas deposit (see Figure, thick arrows). This flooding pattern is the product of the hydrodynamic relationship between the gas- and water-saturated stringers encountered along the profile.

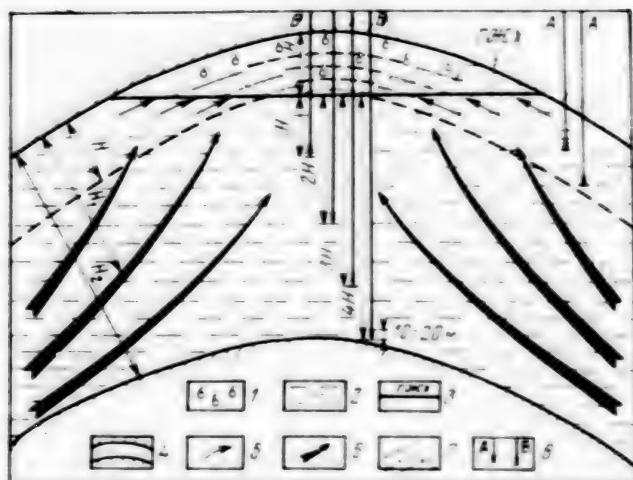


Diagram of Deep Logging of a Water-Bearing Basin with the Purpose of Monitoring Flooding of a Stratiform-Gas Deposit: 1--gas; 2--water; 3--gas-water surface; 4--roof and bottom of water-bearing basin; 5--direction of movement of water through stringers opening into the gas deposit; 6--direction of movement of water from deep horizons that do not open into the gas deposit; 7--flooding of a section of the gas deposit; 8--pressure observation wells: A--foreseen by the "Rules for Developing Gas and Gas-Condensate Fields"; B--recommended for deep logging of a water-bearing basin

In correspondence with this mechanism of reservoir water encroachment, the rate and degree of flooding of a floating stratiform-block deposit would be determined either by the thickness  $H$  of the water-bearing part of the pay section or by thickness  $H_1$ , which includes the part of the thickness of the water-bearing formation which is not included in the deposit and which reacts to the process of its development, or even the entire thickness  $H_2$  of the water-bearing basin underlying the deposit (see Figure).

In the course of assessing the prospects for developing the Medvezh'ye field, we carried out prognostic calculations on the field's gas and water dynamics with the purpose of investigating the possible scale of the field's flooding. Calculations carried out for three variants of the portion of the water-bearing basin subjected to dewatering, differing in thickness (100, 150 and 200 m), showed that the number of flooded production wells and wells undergoing flooding is directly dependent upon the thickness of the portion of the water-bearing basin subjected to dewatering. A dependable knowledge of this thickness would make it possible to correctly assess the required volume of capital investments into development of the field, and to foresee a substantiated number of reserve wells for flooding, and the sequence in which they are to be placed into operation.

Information on the thickness of the water-bearing formation that is subjected to dewatering can be obtained by specially monitoring changes in pressure in

the water-bearing basin. In this connection a new method of monitoring development of stratal-block floating deposits of natural gases involving deep logging of the water-bearing basin was proposed in application to the Medvezh'ye, Urengoy and Orenburg fields.

The method entails the following. In addition to observation, development-observation and pressure observation wells in different areas of the pay section differing in area and depth, pressure observation wells are also drilled inside the outline of the deposit into water-bearing accumulations that do not communicate with the deposit. Each of the additional pressure observation wells is drilled into portions of the water-bearing basin located at different depths--that is, the pressures in the water-bearing basin are subjected to vertical logging (see Figure).

The first deep-logging pressure observation well is used to determine the characteristics of the upper part  $H$  of the water-bearing accumulation. Each subsequent well is drilled deeper than the preceding by an interval  $H$ , and so their depth beneath the gas deposit would correspondingly be  $2H$ ,  $3H$  and so on.

The size of interval  $H$  depends on the ratio of the thickness of the pay section and the underlying water-bearing accumulation that does not communicate with the gas deposit. For deposits with a pay section that is several times thinner than the underlying water-bearing accumulation, this interval may be an amount equal to the thickness of the pay section. For deposits with a thick pay section, comparable in thickness to the water-bearing accumulation, this interval may be an amount equal to half, a third or a fourth (and so on) of the pay section. The lower part of the casing of the wells is perforated to height of 10-20 m.

Reservoir pressure is periodically measured in the wells, and if it decreases, the reservoirs of the water-bearing basin are categorized as the stratal-block type, and the thickness of the bed subjected to dewatering is determined. In the absence of changes in reservoir pressure it is concluded that the lower-lying (in relation to the depth of the last reacting well) part of the water-bearing basin is of the stratal type.

Each subsequent deep-logging pressure observation well is drilled after pressure begins to decrease in the previously drilled well. To reduce the number of deep-logging pressure observation wells, one well could be used to monitor two perforation intervals by isolating one from the other with a packer. In this case tubing is lowered into well to permit observation of pressure in the lower interval, while pressure in the upper interval is determined in the annular space.

On recommendation of the authors the monitoring system based on deep logging has been introduced in recent years at the Medvezh'ye, Urengoy and Orenburg fields. It is already possible to examine the results of deep logging at the Orenburg gas-condensate field (OGKM). It was with it as an example that most of the research has been carried out on the way a water-bearing basin reacts to development of a floating stratal-block gas-condensate deposit.

Flooding of the OGKM began in the earliest stage of development, and it is progressing in time.

Active water ingress is usually preceded by a period of exploitation in which signs of reservoir water become evident. The field is being developed on the basis of the notion that there are three producing formations separated by two relatively impervious shields present in the profile of the pay section. The second and third (counting from the top) formations are being intensively flooded. Flooding is occurring in isolated wells drilled into pools of the first formation.

The activity of the water-bearing basin of the OGKM was studied on the basis of research carried out with pressure observation wells that revealed the different intervals of this basin. The wells are situated both outside the perimeter of the field and within it. The upper holes in the perforation interval (or the top of the open shaft) in wells within the perimeter are located from 50 to 350 m below the gas-liquid surface. Water within the perimeter of the first formation is monitored by two pressure observation wells, it is monitored in the second formation by three wells, and in the third formation it is monitored by six pressure observation wells. In this case two of the wells within the perimeter monitor deep-lying water of the Bashkir tier of the Middle Carboniferous deposit, which does not communicate with the gas-condensate deposit.

A decrease in water levels and reservoir pressures has been noted in all pressure observation wells without exception. The rate of decline of water levels in different wells varies, being within 0.7-1 and 3 m/month. In wells monitoring pressure in deposits of the Bashkir tier it equals 1.5-1.6 m/month.

Depending on observation time and the rate of decline of water levels, the latter changed by different amounts in different wells. In wells where water levels decreased by a significant amount (tens and hundreds of meters), deep-measuring pressure gauges indicate a decline in reservoir pressure. The rate of decline of reservoir pressure in individual wells is 0.15-0.4 MPa/year. The maximum decline of reservoir pressure is 1.5-2 MPa/year. In wells monitoring the water-bearing horizon of the Bashkir tier, water levels decreased by 19-20 m in 12-13 months of observation, while reservoir pressure (calculated) declined by 0.22-0.32 MPa.

Thus as of now the depression cone at the Orenburg field has extended into the water-bearing basin to a depth of over 350 m below the gas-liquid surface, and it has reached the water-bearing pools of the Bashkir tier of the Middle Carboniferous deposit, which do not communicate with the gas-condensate deposit.

The system for monitoring development of the OGKM based on deep logging of reservoir pressures in the water-bearing basin is to be developed further in the next few years.

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HYDROCARBON COMPOSITION OF NOVOPORTOVSKOYE FIELD FLUIDS ANALYZED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 85 pp 24-26

[Article by O. V. Bartashevich, T. D. Ostrovskaya, V. I. Yermakova and A. A. Ovezova, All-Union Scientific Research Institute of Natural Gas: "Laws Governing Change in Hydrocarbon Composition of Fluids from the Novoportovskoye Field"]

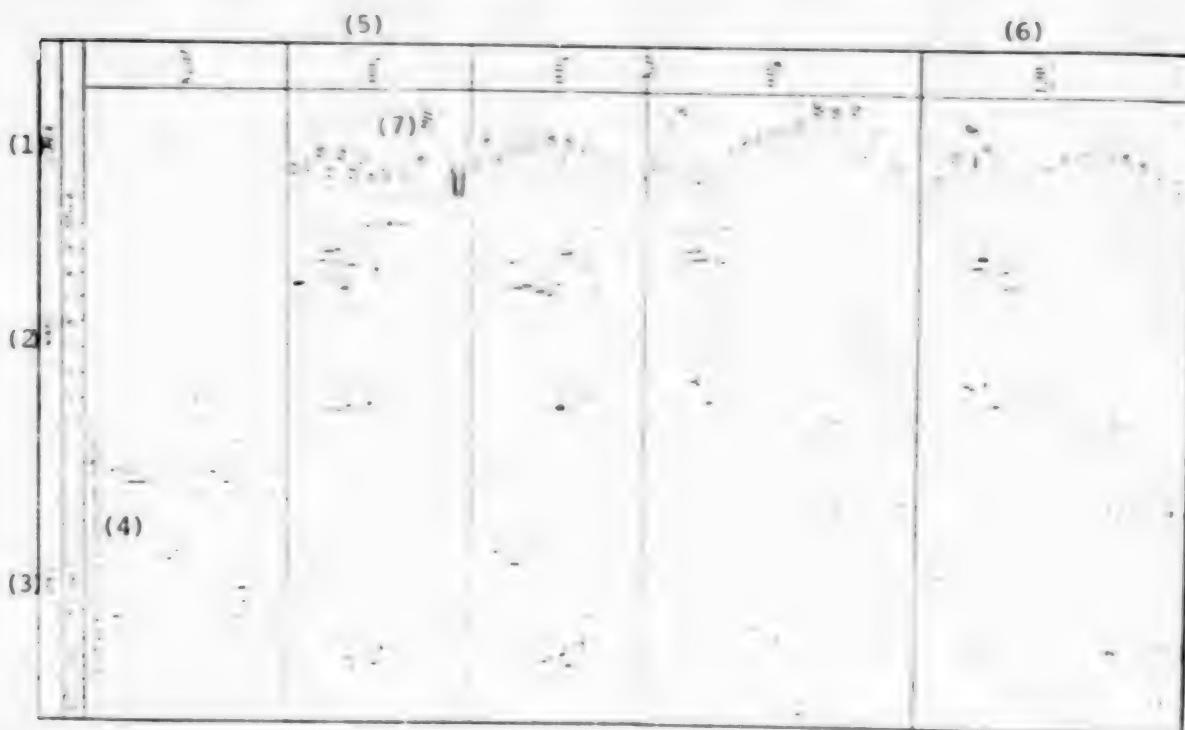
[Text] Comparative analysis of the geochemical parameters of condensates and the low-boiling oil fraction from the same productive formations of the Novoportovskoye field demonstrated the unity of their composition, which is evidence of the unity of their genesis.

The Novoportovskoye field is confined to a local uplift in the southeastern part of the Novoportovskiy rampart, and its profile is distinguished by a unique distribution of deposits: gas in the Senoman deposit (PK<sub>1</sub>-PK<sub>5</sub>, PK<sub>10</sub>), gas-oil in the Albian stage (PK<sub>11</sub>, PK<sub>14</sub>) and oil-gas-condensate in the Hauterivian-Aptian stage (TP<sub>1</sub>, TP<sub>10</sub>), in the Valanginian-Hauterivian deposit (NP<sub>1</sub>-NP<sub>7</sub>), in the Berriassian stage (NP<sub>8</sub>-NP<sub>10</sub>) and in Middle Jurassic deposits (Yu<sub>2</sub>, Yu<sub>6</sub>, Yu<sub>7</sub>). Consequently the role of liquid hydrocarbons increases in the profile from the top down.

The thickness of the productive part of the profile attains 1,700 m. It is overlain by regional shielding masses of Turonian-Danian clay with an overall thickness of 220 m. Moreover several thin clayey fluid-confining strata can be distinguished in the profile of the productive deposits; these strata are uniformly distributed in the Novoportovskaya and Tapanchinskaya formations and in the lower part of the Albian deposits. However, the thickness of the shields is 60 percent of the volume of the Novoportovskaya formation and only 30 percent of the volume of the Tapanchinskaya formation. All of this resulted in the following distribution of productive horizons in the profile: large gas deposits in the Senoman stage beneath a regional shielding Turonian-Danian stratum, one deposit in the Tapanchinskaya formation beneath the Khanty-Maniysk clayey fluid-confining formation and nine productive strata in the Novoportovskaya formation.

The analytical part of the study included determination of the physicochemical properties of the fluids and structural-chromatographic analysis using the methods of infrared spectroscopy, nuclear magnetic resonance, electron

paramagnetic resonance and gas-liquid chromatography. Particular features of the structure and distribution of hydrocarbons in some fluids are reflected in the figure.



Reference section of structural-chromatographic parameters of fluids from productive formations of the Novoportovskoye field: A--fraction up to 200°C; B--fraction over 200°C; 1--methane-naphthene hydrocarbons; 2--aromatic hydrocarbons; 3--benzene tars; 4--alcohol-benzene tars

Key:

- |                               |         |
|-------------------------------|---------|
| 1. Gas-liquid chromatography  | 5. NP   |
| 2. Nuclear magnetic resonance | 6. Yu   |
| 3. Infrared spectroscopy      | 7. MtsG |
| 4. Fraction to 200°C absent   |         |

A pattern of decreasing concentration of  $C_2-C_4$  methane homologues, gradual disappearance of  $C_5-C_6$  and growth of methane concentration are noted in the composition of hydrocarbon gases from top down in the profile. The size of  $C_2+B/C_1 \cdot 100$  increases from 0.3 in the Senoman-Aptian complex to 8 in the Valanginian-Hauterivian complex and to 12 in the Jurassic productive stratum.

Oils in Jurassic deposits (strata Yu<sub>5</sub>, Yu<sub>6</sub>, Yu<sub>2</sub>) possess common physicochemical properties: density 0.860-0.870 gm/cm<sup>3</sup>; fraction to 200°C--10-20 percent;

concentration of sulfur up to 0.15 percent, paraffins 2-7 percent, silica gel tars not more than 5 percent and asphaltenes up to 0.3 percent. The group hydrocarbon composition is 50-53 percent alkanes, 30-34 percent naphthenes and 16-18 percent arenes. The total concentration of C<sub>5</sub>-C<sub>8</sub> in normal alkane fractions boiling at up to 200°C attains 70 percent (gas-liquid chromatography).

Judging from the presence of absorption bands on the IR spectrums at 970 cm<sup>-1</sup> and from the chemical shift signal on the NMR spectrums at 8.6 m.d. [not further identified], naphthene hydrocarbons have a monocyclic structure, and they are characterized predominantly by a cyclohexane structure.

The MTsG/G [not further identified] ratio does not exceed 3.5 (gas-liquid chromatography), which indicates that naphthenes are of secondary significance in the hydrocarbon composition of this fraction. Aromatic hydrocarbons also have a monocyclic structure--benzene and di- and tri-substituted benzene.

In the fraction boiling above 200°C, aromatic hydrocarbons are represented primarily by naphthalenes with substituents taking the form of CH<sub>2</sub> and CH<sub>3</sub> groups. Naphthene hydrocarbons are present in limited quantity. A number of normal alkanes of unfractionated oils have lengths from C<sub>5</sub> to C<sub>28-30</sub>, and the concentration of C<sub>5</sub>-C<sub>8</sub> in the total balance of normal alkanes is 43-57 percent.

Tars consist primarily of hydrocarbon structures--polycyclic aromatic groupings conjugated with a large quantity of CH<sub>2</sub> and CH<sub>3</sub> groups in the presence of a limited concentration of oxygen structures. Alcohol-benzene tars are typified by a higher concentration of sulfoxide structures.

As with oils, condensates from Jurassic deposits are similar in their physicochemical properties. Their density is 0.772-0.784 gm/cm<sup>3</sup>; the concentration of sulfur is 0.02-0.03 percent, and that of paraffins is 1.4-1.6 percent; the fraction to 200°C is 75-81 percent, and its group hydrocarbon composition is 41-53 percent alkanes, 28-34 percent naphthenes and 24-26 percent arenes. Structural-chromatographic parameters are found to be common among the low-boiling fraction of oils and condensates from Jurassic deposits.

Both oil and gas-condensate deposits were discovered in productive strata of the Valanginian deposits (NP<sub>10</sub>-NP<sub>11</sub>, NP<sub>9</sub>, NP<sub>7</sub>, NP<sub>5</sub>, NP<sub>6</sub> to NP<sub>1</sub>). Examining change in physicochemical properties of oils and condensates along the profile of the Valanginian stage and comparing them with the properties of fluids from the Jurassic complex, we would have to assert that a process of lightening of the composition and redistribution of the ratios of hydrocarbons occurs. Thus oils are typified by a decrease in density and in the concentration of tarry components and asphaltenes, and a simultaneous increase in the yield of both the lowest-boiling fraction and the proportion of naphthenes within it.

It should be noted that in comparison with Jurassic productive strata, in the lower productive strata of the Valanginian complex (NP<sub>9</sub>) the principal changes in oil composition are discovered in the low-boiling fraction: The yield of C<sub>5</sub>-C<sub>8</sub> normal alkanes rises to 96 percent, and the quantity of cyclohexane in

the naphthene composition increases. In the fraction over 200°C no changes are observed in the structure of hydrocarbon compounds. The series of normal alkanes decreases to C<sub>25</sub>, C<sub>26</sub>. The structural basis of tars consists of hydrocarbon groups conjugated with sulfoxides, the quantity of which is sufficiently high in alcohol-benzene tars, and oxygen-containing groups, which are present in limited quantities. Asphaltenes do not exhibit high paramagnetism.

Gas-condensate deposits formed predominantly in the NP<sub>1</sub>, NP<sub>2</sub> and NP<sub>3</sub> strata, obviously with oil fringes. Condensates consist of 90 percent low-boiling compounds, and up to 40-60 percent of their hydrocarbon composition is made up of naphthenes represented by cyclohexane substituents. The quantity of arenes decreases to 7 percent in individual strata. The series of normal alkanes extends from C<sub>5</sub> to C<sub>15-21</sub>, with C<sub>5</sub>-C<sub>8</sub> representing the maximum concentration. In terms of general structural characteristics the condensates are similar to the low-boiling oil fraction, but they are enriched by naphthenes to a greater degree: The MTsG/G ratio is 25-78.

A low concentration of normal heptane (0.1-0.5 percent) is typical of condensates and oils from the NP<sub>3</sub>-NP<sub>5</sub> strata, which results in a high MTsG/G ratio (up to 130). The structure of aromatic hydrocarbons does not experience changes: It includes benzene, di-substituted benzene and partially tri-substituted benzene.

Oils from the Aptian-Albian deposits are a special group of fluids characterized by high density (0.910-0.918 gm/cm<sup>3</sup>) and by the absence of a low-boiling fraction. The sulfur concentration in them is up to 0.2 percent, the paraffin concentration is 0.2-0.8 percent, the tar concentration is over 5 percent, and the asphaltene concentration is up to 1 percent. The group hydrocarbon composition is 60-95 percent naphthenes, up to 16-20 percent arenes and 5-20 percent alkanes.

Chromatographic analysis of the fluids showed that normal alkanes are practically absent: An intensive "naphthene hump" is noted on the chromatograms. In the fraction over 200°C naphthenes have a complex structure, while arenes have a bicyclic or more-complex structure (a "triple peak" in the vicinity of 750-900 cm<sup>-1</sup>). The rings are conjugated with a large quantity of paraffin chains.

The structure of benzene and alcohol-benzene tars is unique: They are enriched by oxygen functional groups, while in alcohol-benzene tars the quantity of sulfoxide structures is lower. Asphaltenes exhibit high paramagnetism. The quantitative ratio of oxygen and sulfoxide structures in the tars and the high paramagnetism of asphaltenes indicate that the oil deposits of the Aptian-Albian deposits are in a stage of disintegration.

Thus changes occur in the composition, structure and nature of the distribution of hydrocarbons in deposits, appearing as complex hydrocarbon systems of gas-condensate and oil accumulations, in the productive Jurassic-Valanginian-Aptian-Albian profile of the Novoportovskoye field.

From bottom up along the profile, the density of condensates increases, the yield of the low-boiling fraction rises, the series of normal alkanes decreases to C<sub>15-20</sub>, the role of naphthenes grows, and aromatic hydrocarbons are represented by monocyclic compounds.

Three types of oils can be distinguished. Light oils from Valanginian deposits are similar in properties to condensates. The length of the p-alkane series is up to C<sub>26-28</sub>. The composition of the oils, the structural features of tarry compounds (hydrocarbon groups conjugated with sulfoxide groups) and the low paramagnetism of asphaltenes indicate that the oil accumulations are highly intact.

Oils from the Jurassic and lower strata of the Valanginian complex have a low concentration of low-boiling fraction, aromatic hydrocarbons are represented primarily by bicyclic compounds, and the length of the p-alkane series attains C<sub>29-31</sub>. The structure of tars consists basically of hydrocarbon groups. The paramagnetism of asphaltenes is higher than for light oils from the Valanginian stage. These geochemical parameters are typical of oil deposits of West Siberia.

The geochemical characteristics of heavy oils from Aptian-Albian deposits suggest that the deposits are undergoing biodegradation: They do not contain a low-boiling fraction, p-alkanes are practically absent from the fraction over 200°C, and naphthene hydrocarbons have a complex structure; the oils are enriched with tarry-asphaltene components, and the concentration of oxygen-containing groups is higher in tars, which are simultaneously poorer in hydrocarbon and sulfoxide structures. The high quantity of paramagnetic centers in asphaltenes indicates that they are newly formed in the hypergenesis zone.

Possessing data not only for the Novoportovskoye field but also for the region as a whole, we find it possible to suggest the following hypothesis. Light oils similar to condensates in their physicochemical properties are most probably from oil fringes in gas-condensate deposits. Heavier oils are typical of oil deposits, and in view of their profound transformation, heavy naphthene oils discovered in the upper parts of the productive profile may be evidence of both oil fringes and deposits devoid of gas caps.

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OIL AND GAS

BRIEFS

GAS PIPELINE FINISHED--A new fuel artery has been laid from the Urengoy gas deposit to the city of Yelets, in Lipetsk Oblast. Near the town of Berezovo, the symbolic "red seam" was welded on the 4,000-kilometer route, and line work on the gas main has been completed. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian Feb 85 p 2] 11004

GAS FOR CENTRAL ASIA--Karshi, 6 [Mar] (TASS)--Natural gas from the Shurtan deposit was fed today into the system of main pipeline supplying cities and towns of three union republics--Uzbekistan, Kirghizia and Kazakhstan. The gas is being carried by a new transport main extending 102 kilometers between Shurtan and Mubarek. [Text] [Moscow PRAVDA in Russian 7 Mar 85 p 3] 11004

OIL TAPPED ON VASYUGAN--Oil flows were achieved within a few hours of each other north and south of the Vasyugan River. This is the best confirmation of the promise offered by the new gas and oil region by the Ob River. [Text] [by IZVESTIYA correspondent L. Levitskiy] [Moscow IZVESTIYA in Russian 2 Mar 85 p 3] 11004

ORDER OF LENIN AWARDED--Matchik Shamedov works as a foreman in the Turkmenneft' Production Association. His brigade services 100 wells. The foreman was awarded the Order of Lenin for great production successes. This year the collective headed by M. Shamedov pledged to surpass the oil extraction plan by 2,300 tons. [Text] [Moscow PRAVDA in Russian 20 Feb 85 p 1] 11004

CSO: 1822/209

COAL

#### DELAYS CITED IN UTILIZING MINE METHANE

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 10 Jan 85 p 3

[Article by N. Belov, KAZAKHSTANSKAYA PRAVDA correspondent, Karaganda, in column: "Problem Close-Up": "They 'Pump' Methane Into the Atmosphere"]

[Text] The underground gas methane has always been a threat and problem for miners. If it reaches a certain concentration at the mine face, the first spark will make it explode. The history of the coal industry is above all the war against explosive methane.

In the Karaganda Coal Basin, integrated degasification work has been going on for more than 20 years. Deep boreholes are drilled, the gas is collected in pipes and brought to the surface. The deeper and more intense the mining activity, the greater the emission of methane. Now, with the aid of powerful vacuum pumping stations, about 200 million cubic meters of methane are removed from the earth and put into the atmosphere every year.

Can't this wasted methane be put to some good use? Of course. Five hundred cubic meters of methane are equivalent to one ton of coal. Methane can be used to power automobiles, and can even be used, at a safe concentration, in kitchen stoves. But no thought is yet being given to this in Karaganda. The first, and most easily achievable task, is to convert at least several boilers to methane. Some efforts in this direction have already been made. But this important work is going much too slowly at the Karagandaugol' Association.

In 1975, the gas flame was first ignited in the boiler room of the Imeni 50-letiye Oktyabr'skoy Revolyutsii Mine. There were many doubts and misgivings at the time. Everything turned out to be simple, and even mundane. I visited this boiler room several times: there was a steady blue flame in the combustion chamber; the simple, but sensitive instruments did not allow the methane to reach an explosive concentration.

"After the conversion to gas, the boiler started to operate better," said the chief mine mechanic, Yu. Li. "It became cleaner in the boiler room and the boiler tenders' work became easier."

But, this, as they say, is just a subjective view. Here are the figures. It cost the mine 60,000 rubles to convert one boiler. The savings from the first year of operation totaled 70,000 rubles. Over nine years, the savings are more than a half million rubles, equal to a savings of 70,000 tons of coal. And, although coal is mined nearby, it's not available in unlimited supply--it's strictly accounted for.

In light of such obvious advantages, why aren't the Karaganda organizations hurrying to convert their boilers? There are many reasons. One is the lack of any single organization that could take on the work of coordinating all the project-design and installation work.

Independent enthusiasts in Karaganda have long been working on utilizing the waste methane from mines. One of them is I. Shvets, candidate of technical sciences and director of the Spetshakhtomontazhdegaatsiya Administration, the same organization that removes methane from the coal seams. Through his initiative, and with great difficulty, they were able to order a project design from the Donetsugleavtomatika Trust and order equipment for the first boiler.

After the first step was taken, the enthusiasts were not complacent. Understanding the importance of this problem, USSR Ministry of the Coal Industry [Minugleprom] made several decisions to stimulate the use of the gas mixture in boilers. But, an important step was taken only a year ago: the Spetshakhtomontazhdegaatsiya Administration became the customer and the executive organization for all this work.

"And it was the right decision," says administration chief I. Shvets. "Everything should have been concentrated in one place a long time ago."

Now the administration has been empowered to seek a design organization, place equipment orders, install equipment and hire subcontractors. It would seem that everything is in order. But problems still remain. And that's why the blue flame is burning in the combustion chamber of only one boiler.

Let's consider project design. The local Karagandagiproshakht Institute is not forgetting to include methane use in all of its projects for new and reconstructed mines. But they have categorically refused to design these items, citing their workload. And one has to practically beg the Donetsk specialists for help. They haven't really refused to help, but they require permission from their republic ministry. Then, bargaining begins about travel budgets, and years are added to the projects because of these arguments. Relations are no less complex with the Central Asian Branch of the All-Union Scientific-Research and Project-Design Institute of the Power Industry [VNIPInergoprom], which is doing scientific development work on methane combustion equipment.

A word needs to be said about this branch, or rather about the laboratory for using low-potential energy resources, headed by N. Murakaver. The direct combustion of methane is not always efficient: in practice, it is

very difficult to achieve the proper gas concentration in sufficient volume. To reduce the explosion hazard range, the laboratory workers have proposed retardation--adding a flue-gas mixture to the methane. There are also other approaches, such as burning a low-concentration mixture under a layer of coal. It's time for all this to be realized, but...

"A specialized section needs to be created within the Spetsshakhtomontazhdegaatsiya Administration," says I. Shvets. "Only then will people acquire the experience in converting boilers, and there will be close ties between scientists and designers."

Igor' Aleksandrovich's proposal received support in the Karagandaugol' Association, but the request to form a specialized section has not received any attention. Apparently, they figured that gas is just gas, and there's still enough coal for the next century.

What is the outcome of this ten-year experience in utilizing methane from the basin's mines? One boiler at the Imeni 50-letiye Oktyabr'skoy Revolyutsii Mine has been operating for nine years. Two boilers at the Karagandinskaya and Imeni Kostenko mines have been converted. But, the flame in the combustion chambers quickly went out: during installation and adjustment, the gas concentration changed; now, additional wells need to be drilled. One boiler at the Maykudukskaya Mine is to be started up next year. This is the near-term program of the coal industry, and if it is fulfilled, the use of methane at the basin's mines will reach seven to eight percent. Only a drop in the bucket, as they say. As before, the rest of the gas will be vented into the air.

What must be done to make more efficient use of this valuable fuel? First of all, local forces must be brought in to develop projects for gas combustion at various concentrations and by various means. Equipment installers and adjustment specialists must be concentrated in one specialized subdivision. It wouldn't be a hindrance to provide material incentives for the people involved: it would be a great benefit to have the work speeded up, and the government would save hundreds of thousands of rubles. These is one other important aspect to this work: it would greatly improve the air quality around mining cities and settlements.

When the above had already been written, . Murakhver, director of the VNIIenergoprom laboratory, telephoned KAZAKHSTANSKAYA PRAVDA correspondent's office in Karagandy.

"We just received a notice from Donetsk," he said happily. "The boiler at the Imeni Skochinskiy Mine was converted to methane, incorporating the retardation method we developed. The boiler is operating excellently."

Isn't it a rebuke to us that the ideas of Kazakhstan scientists are first applied in the Ukraine? Retardation technology can make it possible to increase methane use up to 25 percent at mines in the Karaganda Coal Basin, saving hundreds of thousands of tons of coal. This task is especially important in light of the recent instructions of Comrade K. U. Chernenko

contained in his speeches at the CPSU Central Committee Politburo session. He said, "Conservation now will become the most important source for increasing production." The inexpensive mine gas methane can and must become an important reserve for conserving fuel and energy.

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CSO: 1822/133

COAL

#### NEW CONTINUOUS MINER FEATURES DC DRIVE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Nov 84 p 2

[Article by L. Gurevich, mining engineer, Donetsk, in column "Science For Production": "Direct Current at the Face"]

[Text] The use of direct current in coal mines is nothing new, although it is used only for underground transport. It was not used at all for coal-mining mechanisms. Therefore, one of the new developments of recent years is a continuous coal miner that is propelled along the coal face by a direct-current drive. The first such machines were developed and tested by specialists in Karaganda and around Moscow, together with designers from the Avtomatgormash Scientific Production Association in Donetsk.

The brigade of Petr Frolov of the Raspadskaya Mine in the Kuzbass produced over 11,000 tons of coal per day from the start with the IKShE experimental machine. You can literally count on your fingers the number of mines that have that high a daily production, and in this case, it's all from one face. Recently, this continuous miner had completed its service life and was brought above ground. It had produced over one million tons of coal in 14 months.

Now, the brigade of P. Frolov has assembled and tested, above ground, a new IKShE continuous miner. This one was built at the Imeni S. M. Kirov Machine-Building Plant in Gorlovka, rather than in the institute workshops, where the first one was built. The machine was installed in the mine in October, and it quickly went to work. A total of 10 new continuous miners are to be built in Gorlovka this year by order of the USSR Ministry of the Coal Industry. The first two have already been shipped to the Kuzbass, others are being shipped to Karaganda and Vorkuta, where there are seams up to 5 meters thick suitable for this machine.

What is this new machine? KShE stands for milling-type continuous miner with electric drive. It should be added that the electric drive is a direct-current thyristor drive. This power unit converts alternating current into rectified direct current to propel the machine along the face.

Undoubtedly, specialists will understand what it means to replace alternating current with direct current. For the non-technical reader, we

should explain that a direct-current drive for the machine means that an energy-saving technology is now being used. In addition, machine output is improved--the work goes faster and easier. For the Frolov brigade at the Raspadskaya Mine, the IKShE machine works simply, like the shuttle on a loom: up and down non-stop, making its own cut to start each end of the face. Of course, much here depends on the good organization of labor within the brigade, but you must agree that only a reliable machine and a reliable electric drive could produce these high indicators.

In addition, the machine's automatic equipment plays no small role. The devices, with all necessary sensors and the continuous-miner remote-control panel were manufactured in Makeyevka by the Mine Automation Plant, part of Avtomatgormash Association.

In conclusion, a few words are in order about the other advantages of the electrically driven continuous miner over hydraulically driven machines. The flammable oil in modern hydraulic drives causes a lot of problems for miners. Here, the electric drive can be fully repaired even at the coal face. And, considering that hydraulic drives simply cannot move very heavy continuous miners, it becomes clear: the implementation of these new, innovative machines promises large benefits and justifies itself on all points.

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COAL

## STEPS ORDERED TO IMPROVE EKIBASTUZ COAL QUALITY

Moscow IZVESTIYA in Russian 27 Dec 84 p 2

[Article in the column: "IZVESTIYA Reported. What Was Done?": "Stockpile and Kilowatt"]

[Text] Ekibastuz. Here, everything is "the very most." The coal seams are one hundred meters or more thick. In the surface mines, bucket excavators can mine coal and load it into rail cars at a rate of 5,000 tons per hour, or 120,000 tons per day. At the Ekibastuz Station, super-heavy trains, up to 30,000 tons and 3-4 kilometers long, are made up. The trains are pulled by the very largest locomotives.

But this is the problem: at the thickest coal seams in the country, the gigantic excavators load only 12,000-16,000 tons of coal per day, instead of 120,000 tons. The number of coal trains leaving the station is far below plan. In addition, the trains sometimes carry coal of such low quality that it threatens reliable power-station operation. Loading is often monitored visually, causing overloading and coal losses in transit. The authors of the report "Stockpile and Kilowatt" (IZVESTIYA, Nos 277/278, 1984) described this circle of problems.

After the IZVESTIYA report, the USSR Council of Ministers obliged USSR Minugleeprom [Ministry of the Coal Industry], USSR Minenergo [Ministry of Power and Electrification], Ekibastuzugol' Association and KaSSR Minenergo to exercise joint monitoring of standards compliance for coal supplied to electric power stations. They were also obliged to improve the technical control services and call to task those officials guilty of allowing standards violations. It was pointed out that measures must be taken to accelerate the construction of the Vostochnyi Surface Mine and to put the coal blending systems at its loading station into operation on schedule.

The Ministry of Railways was directed to consider the question of providing the Tselinnaya Railroad a minimum number of rail cars for the

Ekibastuzugol' Association to ensure the steady operation of excavators and the proper blending of coals. The Ministry was also directed to ensure coal shipments to large electric power stations by unit trains composed of a single type of rail car.

The USSR Ministry of Power and Electrification was directed to prepare and present to USSR Gosplan, in the first quarter of 1985, proposals on accelerating the construction of electric power stations which use Ekibastuz coal. USSR Gosplan was directed to review these proposals and include the corresponding tasks in the draft of the 12th Five-Year Plan.

Due to the fact that the Ministry of Instrument Making, Automation Equipment and Control Systems was well behind schedule in fulfilling its tasks to manufacture and supply instruments for continuous quality control of coal in the production flow and in rail cars, the Ministry has been obliged to speed up work in this direction.

USSR Minugleprom and USSR Minenergo were directed to report to the USSR Council of Ministers on the elimination of these problems and on the measures taken in regard to the decision.

The editors also received answers from the management of the ministries of railways, the USSR Ministry of the Coal Industry and the USSR Ministry of Power and Electrification. These answers stated that, at the behest of the USSR Council of Ministers Commission on Monitoring the Supply of Fuel, Electricity and Thermal Energy to the Economy and the People and on Energy Conservation, a group of senior personnel from USSR Minugleprom, USSR Minenergo, Gosstandart [State Standards Committee], USSR Gossnab [State Committee on Material and Technical Supply] and KaSSR Gosplan were sent to Ekibastuz enterprises. They developed a broad series of measures to ensure that the coal arriving at electric power stations met the standards.

The increase in the country's industrial power is inseparable from the further development of the fuel-energy complex. The role of Ekibastuz in supplying the country's needs is very critical. The IZVESTIYA editors will give constant attention to the effective and efficient development of this coal field.

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COAL

NEW COAL LIQUEFACTION, GASIFICATION METHODS DEVELOPED

Moscow IZVESTIYA in Russian 23 Dec 84 p 6

[Article by A. Blokhin in column "Projects, Completions": "Fuel of the Future?"]

[Text] The brief lines of the Ukase of the Presidium of the USSR Supreme Soviet read: for a great contribution to the development of the country's fuel-raw material base and to the development and industrial implementation of innovative scientific-technical solutions, the Institute of Fuel Resources [IGI] of the USSR Ministry of the Coal Industry is awarded the Order of Labor's Red Banner.

A wide instrument panel nearly divides the fuel hydrogenization laboratory in half. The process is being carried out at a pressure of 100 atmospheres. The instrument board of the control panel is armored with steel.

"Such a low--yes, low!--pressure," emphasized the institute director, Professor and Doctor of Technical Sciences A. Krichko, "is one of the main advantages of our technology. The hydrogenation process--that is, converting coal into coal petroleum--is done at pressures of 600-700 atmospheres at research installations in other countries. You can imagine how much that complicates the equipment, and how much more dangerous the production process is. In Tula Oblast, the first semi-commercial installation for producing synthetic fuel (ST-5) was built at the Bel'kovskaya Mine. The installation can process five tons of coal per day. An ST-75 installation is under construction at the Berezovskiy Surface Mine in the Kansk-Achinsk Coal Basin.

This "coal petroleum" can successfully produce high-octane gasoline and diesel fuel, as well as fuel oil with improved properties.

The raw coal, which will be mined in gigantic surface mines east of Krasnoyarsk, contains up to 33-35 percent moisture. This is removed by rapid heat-treatment (hence the term, "termougol'" [thermocoal]) in vortex chambers. The high temperature blocks the pores with resin, thus

preserving the coal. Thermobriquettes, manufactured by a similar process, are intended for community and domestic use.

Based on IGI research, the Giproshakht Institute [State Institute for Mine Project Designs] in Leningrad developed a project for the Termougol'-100 installation, which is to produce 100 tons of high-quality fuel per hour. It also is designed for the Kansk-Achinsk Basin.

"The Institute of Fuel Resources," comments G. Nuzhdikhin, deputy minister of the USSR Coal Industry, "is the main scientific center, combining and coordinating research on coal properties and on developing new technologies for using coal. The main fuel of the last century is entering a 'second childhood' in our time. The research at IGI has great value in this regard. They are an important contribution to the government-wide program for developing new technologies."

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COAL

MINE BROUGHT UP TO FULL CAPACITY TWO YEARS EARLY

Moscow PRAVDA in Russian 9 Dec 84 p 1

[Article by M. Kryukov, PRAVDA correspondent, Rostov Oblast in the column "From the Place of Action": "Miner's Achievement"]

[Excerpts] One of the country's largest coal mines was brought up to full output two years ahead of schedule.

The Imeni 60-letiye Leninskogo Komsomola Mine of the Gukovugol' Production Association is one of largest enterprises in the country's coal industry. Yesterday, it produced its three-millionth ton of coal since the beginning of the year. The miners' collective achieved a great labor victory: the mine reached full output two years ahead of schedule.

"The mine was put into production ahead of schedule six years ago, along with the Imeni 60-letiye SSSR Enrichment Plant," said L. Chernyshkov, association director. "This is a highly mechanized complex for producing and processing anthracites. It was to have reached full production in the last quarter of 1986. This was achieved two years ahead of schedule. Over its lifetime, the complex has produced 2.8 million tons of coal above plan, over one million tons of which was high-grade anthracite. This coal helps satisfy the needs of the population. The plant produces five grades of coal, three of which have been awarded the Mark of Quality."

It's not easy to produce coal in this mine. The seam is not very thick--only 0.8-1.2 meters. The miners know how difficult it is to mine such a seam--it's hard to increase the production rate. Even the mining and geological conditions are difficult. From the very first days the complex was in operation, the main goal of competition was to reduce the time needed to bring it up to full capacity. The work was carried out in several directions. New equipment and the best experience were earnestly implemented. A number of project-design decisions were reviewed, taking into account the mine conditions.

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COAL

## SHORTCOMINGS IN COAL MACHINERY CONTINUE

Kiev PRAVDA UKRAINY in Russian 2 Feb 85 pp 1-2

[Article by A. Zharkikh, N. Ladanovskiy and V. Mishchenko, special PRAVDA UKRAINY correspondents in the column "Creative Activism of the Masses, High Rates of Scientific-Technical Progress and Rationalization of All Production Links for the 27th CPSU Congress--A Republic Review": "Machinery for Miners"]

[Text] The republic's coal industry is now going through a transition period. The production and entry-driving machinery which faithfully served the miners for over two decades does not now fully meet modern requirements. More difficult geological conditions have made it harder to mine the coal. This has necessitated a complete re-equipping of underground mines. PRAVDA UKRAINY wrote about this problem in January 1982. At that time, scientists, designers and machine builders were preparing for this important next step. There were many positive statements and promises. There were bright prospects for the further acceleration of scientific-technical progress in the sector. Several developments were even realized in metal.

Three years have passed. What do miners have now in their equipment arsenal?

### There Is, And There Isn't

"Science has done its part," was the way S. A. Saratikyants, director of the Donetsk Coal Scientific-Research Institute, summed up our conversation on the contribution of scientists to the development and improvement of new mining machinery. And truly, a lot has been done. Powerful coal-mining and entry-driving machines have been developed and built in this five-year plan. These include the KMT, KM-88 UMP, KD-80, and IKM-103 mining systems; 4PP-2 entry-driving cutter-loaders and other machinery.

Many of them have proven themselves in operation. For instance, the entry-driving brigade of V. A. Plyuvaki, using a 4PP-2 cutter-loader, set a record at the Voroshilovgradskaya-1 Mine, Voroshilovgradugol' Association: they completed 1,000 meters of large-cross-section mine developments in one

month. Many mining collectives have achieved excellent results with KMT and KM-88 UPM systems. For instance, I. F. Manekin's brigade of coal-face workers at the Imeni Zasyad'ko Mine in Donetsk produces 1,500 to 2,000 tons of coal per day, thanks to the new machinery. Nonetheless, in this five-year plan, the planned volume of equipment replacement in Donbass mines was not achieved. Only a small amount of powerful, modern equipment reaches the coal faces. Why?

Scientists and designers worked many years to develop the IKM-103 mining system. There were great hopes for the machine, because this machinery was to solve the problem of mining the thin, gently sloping seams which now make up a significant portion of the Donetsk Basin coal reserves. There were hopes, but...

Before our own eyes, A. V. Shmygol', Technical Director of Pavlogradugol' Association, had to, as they say, prevail upon the director of one mine to accept shipment of one of the systems. The mine director refused, because the same system produces only 199 tons of coal per day at a neighboring mine. The reason: design deficiencies. This is the reason for the present attitude of miners toward the new system.

Nonetheless, series production of the system was begun.

"It happened that the prototype was tested under 'greenhouse conditions,' " believes V. A. Yurgelevich, chief engineer of the Gorlovka Machine Building Plant imeni Kirov. "The system did work fairly well at the Yasinovka-Glubokaya Mine, Makeyevugol' Association, where the geology is most favorable. But, at other mining enterprises with typical Donbass mining conditions, the system, as they say, couldn't do the job."

In fact, over 20 such systems were shipped last year to re-equip the republic's mines. Not one system produced the expected results. Such components as the electromagnetic clutch and the planetary reducer proved very unreliable. The lever system fails frequently, along with other problems. The situation was not even improved when the plant specialists made about 1,000 design changes and improvements in the cutter-loader during series production. The upshot is that production of the systems has been temporarily halted, and the designers must bring the machine up to the proper technical level.

The designers of the Poisk-2 cutter-loader were apparently also counting on "greenhouse conditions." This machine was developed by the Gorlovka Branch of DonUGI [Donetsk Coal Scientific-Research Institute]. Knowing full well that the compressed-air supply at most mines today operates at barely 2 atmospheres, they developed and began series production of a unit with a working pressure of 4 atmospheres. The result: only 4 of the 11 such cutter-loaders at Ordzhonikidzeugol' Association are operating, and only 5 of the 12 at Dzerzhinskugol' Association are operating. And those that are in operation have poor indicators.

We cannot excuse the equipment operators, who should have taken better care of their compressed-air systems. But, scientists must take a more realistic look at the situation and base their work on the actual situation in the mines. For the sake of fairness, it should be noted that this oversight is being corrected. A Poisk-2 with an electric drive is now being tested at the Zolotoye Mine, Pervomayskugol' Association. But think of the time and money wasted! And this equipment is sorely needed by miners working steeply pitching seams 0.3 to 0.8 meters thick.

In general, miners have good comments on the 4PP-2 entry-driving cutter-loader. This is a powerful, high-production machine. But even here, the designers have, as they say, let a fly get into the ointment. The unit's dust-suppression and ventilation system is extremely poor. It is huge, makes a lot of noise, and does not reduce dust to the proper level. Therefore, entry-drivers often refuse its "services." This, of course, negatively affects the pace of development work. The machine even received a state Seal of Quality. At the end of this year, the Yasinovataya Machine Building Plant plans to begin production of an improved version, the 4PP-2M. It is hoped that its new dust-suppression and ventilation system will meet the entry-drivers' expectations.

We could go on and on with similar facts. There still hasn't been an abundance of well thought-out design and engineering decisions. The institute collectives hurry to get their creations to the machine builders for series production as quickly as possible, even when the machinery obviously requires further improvement. The plant specialists are forced to make the improvements. After all, each institute has its experimental base, which is supposed to produce machinery prototypes that are fully ready for series production.

The previously mentioned PRAVDA UKRAINY article expressed the following desire: "a procedure should be established where the design institute would constantly improve its design and be responsible for it throughout the entire period of series production." The miners are for this proposal. The scientists, unfortunately, have not reacted to it.

#### Too Many Cooks

A prototype KD-80 mining system has been operation over two years at the Ternovskaya Mine, Pavlogradugol' Association.

"This is a machine of the future. This is the machine, in our view, which will replace the Donbass mining system in thin seams. Although widely used by the association, the Donbass system is outmoded," says N. S. Pundik, chief engineer of the enterprise. And he adds bitterly: "However, the average daily output of the new coal-mining machine is still only 139 tons."

"The KD-80 is an excellent machine," said S. M. Arutyunyan, chief engineer of the Dongiprouglemash Institute (Donetsk State Project-Design and Experimental Institute of Coal Machine Building).

"Our KD-80 cutter-loader for this system meets all present requirements," considers V. A. Yurgelevich, chief engineer of the Gorlovka Machine Building Plant imeni Kirov.

"There have been no complaints about the roof supports we produce for the KD-80," affirms V. I. Kravtsov, director of the Druzhkovka Machine Building Plant. And, one can agree with this.

But, the weak link in the system is the SPTs-151 scraper conveyor, manufactured by the Svet Shakhtera Plant in Kharkov. A point must be emphasized here. The KD-80 system has a general developer, Dongiprouglemash, and a lead production enterprise, the Druzhkovka Machine Building Plant imeni 50-Letiye Sovetskoy Ukrayny. They have been assigned to coordinate the efforts of all the contributors and to prevent any technical mismatch between system components. But alas, there is no one organization responsible for the KD-80. Too many cooks have spoiled the soup. However, despite the technical improvements that are still needed, the machine builders are planning to produce 15 machines this year. And no one has objected, although everyone knows about the conveyor's unsuitability.

The story of the Strela-77 drilling machine is just as strange. It was first produced in Gorlovka, and then transferred to the Krasnyy Luch Machine Building Plant. It is difficult to understand this reassignment, since the technical level of the latter plant is not sufficiently high to produce such a complex machine. And, as a result, miners did not receive a single drilling machine over the next four years. Only in 1975 was production of the Strela-77 again assigned to the Gorlovka plant. And, although much precious time was lost, production of this essential machine is increasing extremely slowly. Only 30 machines were shipped to mines last year, while hundreds are needed.

The natural question arises: what about the UkSSR Ministry of the Coal Industry? What is its role in re-equipping the sector and in coordinating the efforts of scientists, machine builders, and miners?

"Truly, the transition period from the old to the new generation of equipment has been a little too long," admitted N. S. Surgay, first deputy minister of the coal industry. "But now, although belatedly, our designers and process engineers have developed modern, high-production systems. Coal machine building, unfortunately, is adjusting even more slowly."

How did all this happen? Didn't the ministry really see the future growth of the sector and think about what kind of equipment the miners would need in the future?

#### The Cutter-Loader Is Good, But...

We began our conversation in the Yasinovataya Machine Building Plant party committee with a question: how do the plant personnel themselves evaluate the quality of their output?

"The miners are satisfied with our equipment," emphasized A. I. Rusachenko, secretary of the enterprise party committee. "This is reflected in their letters of gratitude. In particular, they give high marks to the new 4PP-2 entry-driving cutter-loader."

We heard another evaluation of the machine's quality of manufacture. This is the story related to us at the Slavyanoserbskaya Mine, Voroshilovgradugol' Association. The entry-drivers in P. A. Otachuk's brigade, trying to accelerate the pace of mine development, decided to install a 4PP-2 cutter-loader at the mine face, and were disappointed when they tested it in operation. One part after another failed, and the face was idle for weeks. In November of last year, the repair took almost a month: the motor gave out. In sum, the brigade advanced 60 meters less than planned, and lost about 200 meters of development work for the year. So much for new equipment!

"We called out the plant representatives," the miners told us. "They admitted their guilt, helped to eliminate the deficiencies, and left. But, in a few days the same thing happened."

This equipment more than once let down the brigade of A. V. Onopchenko at the Imeni Lenin Mine of the same Voroshilovgradugol' Association, as well as other entry-driving collectives. In fact, an especially large amount of criticism has been leveled at the quality of equipment recently supplied to the mine faces. It's no wonder that A. I. Shlyakhov, quality control chief of the Yasinovataya Plant, has visited the basin's coal enterprises so often.

The Gorlovka machine builders had apparently come up with a useful, important idea at the start of this five-year plan. They decided to organize their "own" technical service of the 133 mines and mine administrations around the country which use their equipment. But, they were not able to fully implement their idea. As a result, miners have frequently criticized them and sought recompense for poor quality.

The Druzhkovka Machine Building Plant for many years has been producing hydraulic roof supports. It would seem likely that they would have perfected them by now. But alas! As before, the miners have criticized the performance of the hydraulic system. A number of other components are also not highly reliable.

#### The Wrong People Accumulate Things

At present, the republic's coal industry has 1,004 mechanized systems, 844 entry-driving cutter-loaders, 152 plow systems, 2,400 coal-mining cutter-loaders and much other mining equipment. Most of the miners' collectives take care of their equipment as if it were their own. And they get high production in return. For example, the workers of the sector-leading Donetsktol' Association have for many years been steadily increasing the pace of coal production. Today, 12 mining teams produce 1,000 or more tons of coal per day. Among them are the integrated brigades of: Heroes of Socialist Labor A. D. Polishchuk of the Trudovskaya Mine and I. S. Negurtsa of the Imeni Zasyad'ko Mine, as well as the brigade of USSR State Prize Laureate B.

A. Kostretskiy of the Mine Administration imeni Gazeta Sotsialisticheskiy Donbass. They are helped in this by the widespread movement under the slogan: "Socialist Safe-Keeping for Mining Machinery!"

The interesting experience of the Trudovskaya Mine collective deserves mention. The party and trade-union organizations, along with management, have gotten the miners to take good care of their equipment. The system of mutual control works effectively here. The procedure is simple and reliable. For instance, when the entry-drivers receive conveyors, rails and other equipment, they are obligated upon completion of the development work to pass it all along to the production miners. The latter without fail check to see if everything needed for normal operation is in place. The new procedure for turning in used metal roof supports, materials, spare parts and individual machine components has been very useful. Now, each mid-level manager knows what he is to return when to the storeroom when a working is finished. If you don't fulfill the task, you don't get a bonus.

Also, there are now special containers in each section for clips, nuts, rail chairs, bolts etc. which have been found on the ground. Every month, these "piggy banks" are brought to the surface. The reclaimed parts are then returned to service. The miners also profit from this: the brigade receives an award of 30 percent of the cost of the materials saved. There are other similar examples. The Krasnoarmeyskugol', Roven'kiantratsit and Sverdlovantratsit associations and many of the mines of Pavlogradugol' Association operate their equipment properly and wisely use all their resources. However, there are cases of the opposite. For instance, a check done last year at Ordzhonikidzeugol' Association showed that at the Bulavinskaya, Yenakiyevskaya, Krasnyy Oktyabr' and Imeni Karl Marx mines alone, 120,000 rubles worth of uninstalled equipment was spread around the mine yards. Mine cars, sections of heading machines, reducers, transformers and loaders were rusting and becoming unfit for service. Sixteen thousand rubles worth of equipment was mistakenly sent to the Yenakiyevskaya, where it sat around uselessly for several months. Is it any surprise that the association operates unsteadily, and is behind in fulfilling their plan?

The situation at the Imeni 50-Letiye SSSR Mine, Krasnodonugol' Association, is even sadder. Last year, 1.7 million rubles worth of equipment sat idle there. Two KM-97 systems, three USB-67 plow systems and two 4PP-2 entry-driving cutter-loaders--all covered with rust--sat unprotected in the mine yard. Incidentally, the mine reports stated that several pieces of this equipment were in operation. In particular, one of the entry-driving cutter-loaders which had been returned after capital repairs was dismantled, and entire component assemblies had disappeared. According to information given by chief engineer Yu. Sh. Leladze and chief mechanic Yu. F. Chernyy, the cutter-loader was either being installed, or in operation. Also, around 400 sections of KMS-97 roof supports, 30 electric motors and 16 conveyor reducers were lying around the yard uselessly.

Meanwhile, there have been frequent complaints about the lack of production and entry-driving machinery and other mining equipment. As we have seen, the scarcity of this equipment is partly caused by the miners' negligence.

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COAL

BRIEFS

NEW FAR-EAST COAL MINES--Vladivostok--The new surface coal mine in the Pavlovskoye Coal Field will be a reliable fuel base for the Far East's industry. The first tons of coal have been produced here. The new enterprise is the second phase of the Pavlovskiy Surface Mine. At full capacity, the mine will produce 4.5 million tons of coal per year for the region's enterprises. Several months ago, the nearby Luzanovskiy Surface Mine, with a capacity of one million tons per year, began operation. The accelerated development of the Far East's mining industry will provide the necessary fuel reserve to significantly increase the output of power-generating enterprises. [Excerpts] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Jan 85 p 1] 12595

MINE CAPACITY REACHED EARLY--Rostov Oblast--The newest mine in the Don region, the Imeni 60-letiye Leninskogo Komsomola (Gukovugol' Production Association), reached full capacity two years ahead of schedule. The last trainload of anthracite brought the year's production up to three million tons. This capacity was to have been reached in late 1986. "These aren't the best conditions. A single seam only 0.8-1.2 meters thick is being mined," says mine director K. Dem'yanov. "The rocks are very hard, and water must be pumped away from the mine face." But where do you find enough equipment and workers? They resolved to increase the output per coal face. The production brigades were equipped with SN75 plows. The mine production and transport layouts were reviewed. All of these measures made it possible to increase the average daily production to 8,768 tons in 1984. Labor productivity was 7.6 percent higher than planned. [By V. Ukhakin] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Dec 84 p 1] 12595

NEW COAL-ENRICHMENT CAPACITY--A large flotation shop started operation at the No 38 Enrichment Plant, the oldest in the Karaganda Coal Basin. [Text] [Moscow EKONOMICHESKAYA GAZETA No 52, Dec 84 p 3] Pre-startup testing of all the process equipment has begun at the Neryungri Enrichment Plant, now under construction. [Text] [Moscow EKONOMICHESKAYA GAZETA No 52, Dec 84 p 3] 12595

FASTER MINE DEVELOPMENT--Ekibastuz, Pavlodar Oblast--By carrying out stripping work and equipment installation at the same time, the construction of the first phase of the 7.5-million-tonnes-per-year Vostochnyy Surface Coal Mine was accelerated. According to the project, the conveyor system for bringing the coal to the surface from a depth of 30 meters was to have been assembled at the faces. But this would have meant waiting a half a year while general construction work was completed at the surface mine. In order to lose no time, the installers suggested assembling the complex machinery into subunits along the pit edge and lowering them into place as the site was readied.

[Text] [Moscow SEL'SKAYA ZHIZN' in Russian 29 Jan 85 p 1] 12595

BORODINSKIY MINE OUTPUT INCREASES--Borodino, Krasnoyarsk Kray--Additional coal-mining capacity of a half-million tons per year has been implemented at the Borodinskiy Coal Surface Mine, located on the eastern flank of KATEK [Kansk-Achinsk Fuel-Energy Complex]. With this new capacity, the Borodinskiy Mine has reached its full design capacity of 25 million tons per year. But that's not the limit. Stripping work is to begin to uncover a new seam, the Borodinskiy-2. This will bring the mine's total capacity up to 65 million tons of coal per year. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 31 Jan 85 p 1] 12595

ROSTOV MINERS OVERFULFILL PLAN--Novoshakhtinsk, Rostov Oblast--The production miners' brigade at the Imeni V. I. Lenin Mine is now producing coal in excess of their 11th Five-Year Plan goal. Using a plow system in very thin anthracite seams, the leading collective produced almost 1.1 million tons of anthracite in four and a half years. [By Yu. Pozdnyak] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Feb 85 p 1] 12595

NEW DRILL TESTED--Krivoy Rog--Tests of a new drilling unit have been completed here at the Kommunar Mine of Imeni Dzerzhinsky Ore Administration. The unit was developed by the All-Union Scientific-Research and Project-Design Institute of Ore-Mining Machine Building. It consists of a deep-drilling machine and a compressor. The new high-speed underground machine proved itself by completing 43 meters of bore holes in a single shift. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 22 Jan 85 p 1] 12595

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GENERAL

## INSTITUTE DIRECTOR URGES INTERDEPARTMENTAL COORDINATION

Moscow MOSKOVSKAYA PRAVDA in Russian 6 Dec 84 p 2

[Article by I. Shchipulin, candidate of technical sciences and director of the All-Union Scientific Research Design and Technological Institute of Hydroelectric Machine Building: "We Have the Papers, We Need the Technology", under the rubric "Science and Economics"]

[Text] As if referring to the basis for effectively developing production, the title of this article reflects the manner in which comrade K. U. Chernenko spoke about the widespread implementation of scientific and technical achievements in the national economy at a sitting of the CPSU Central Committee Politburo on 15 November. And in the CPSU Central Committee and USSR Council of Ministers' decree "On Measures for Accelerating Scientific and Technical Progress in the National Economy", the advances in developing science and technology are directly tied to the realization of combined programs, including including special-purpose programs.

A VNIIgidromash collective, together with other NII's [Scientific Research Institutes] and KB's [Design Bureaus] are also involved in realizing a number of combined and special-purpose programs. And considering that the decree calls for them to be carried out, and for this to be done first and foremost, VNIIgidromash has decided to restructure its operation so as to direct the entirety of its forces and reserves toward the completion of this work. We started out with an analysis of the progress made in completing the plans of the institute which were devoted to a specific topic, and of the introduction of our developments, in accordance with the combined plans, into the national economy. We gave special attention to the omissions and difficulties which we encountered while realizing the engineering developments.

Special emphasis was laid on rectifying fundamental mistakes and omissions, and, working together with the party organization, we are improving the work of all the institute's links. Thus, for example, we succeeded in improving the organization of the effort through improvements in planning and with economic incentives. This, in turn, led to improvement in the research efforts, to reductions in the time spent in research work, and to a reduction in labor outlays. Many of our internal reserves await realization.

But we also have problems which evidently need solving on the scale of the entire national economy. We will dwell on certain of them which are familiar to us because of the difficulties which they have created.

For example, VNIIgidromash, within the framework of a special combined-special purpose program developed a number of monoblock pumps, which meet the most stringent requirements for this equipment. Their negligible metal- and labor-intensiveness deserves special mention. But for these pumps to be operated, the motor shaft ends need to be lengthened. USSR Minelektrotekhprom [Ministry of the Electrical Equipment Industry] developed similar motors as far back as 1981, but their production was set up poorly. For some reason, the pump-building industry will receive the bulk of these products by the end of the year. Naturally, the industry is in a fever, since many enterprises do not receive the new goods which they need on time. This is a situation which hinders the implementation of the program.

Let me add that over the years, Minelektrotekhprom organizations have been at work developing low-noise electric motors. No results are in as yet. Nor has the industry reflected any demand along these lines. Here's another example: our subsector, in compliance with GKNT [USSR Council of Ministers' State Committee on Science and Technology] special-purpose programs and with other instructional documents, has developed and is manufacturing a variety of pumps, without which most production lines and installations would be just so much scrap. It has been many years since it happened that we let anyone down like this, i.e., by not designing, or by not starting up production of an order of pumps on time.

But often it is impossible to insure high quality for this equipment without the support of the sectoral clients. And it is difficult to get this support, and at times it is impossible.

Thus, during the last five-year plan period, in accordance with a special GKNT program, a number of ministries had to develop and start up production of some equipment which would complete an assembly, part of which were proportioning pumps, which we produced. Here, let me say that the special purpose programs are designed to bring the scientific minds from a number of ministries together into a unified collective, which subsequently, as has been shown in practice, facilitates and accelerates the resolution of the most pressing national economic problems.

USSR Minstankoprom [Ministry of the Machine Tool and Tool-Building Industry], Minneftekhimprom [Ministry of the Petroleum Refining and Petrochemical Industry], USSR Minpribor [Ministry of Instrument Making, Automation Equipment, and Control Systems] and USSR Minavtoprom [Ministry of the Automotive Industry] have developed and produced test batches of high-quality reduction gear motors, packing seals, electric actuating mechanisms and ball valves. Work such as this was obviously within their capabilities. But series production of these products, which would sharply increase the output of new equipment, and would meet the decree's requirements with regard to the need for the high-priority realization of combined and special-purpose programs, has not yet been begun

by these ministries. Our repeated pleas to them have as yet elicited no results, and so far there has been no return on this development work of ours, even though it cost us quite a bit. But the first consideration is that the demand for this equipment is still increasing, and the above-named ministries are still going to have to set about producing the above-named equipment. So why put it off?

The effectiveness of most of the scientific research institutes depends on the rapid and qualitative introduction of the results of their work into the national economy. This especially concerns the research developments which have been worked out within the special-purpose programs in which several scientific subdivisions participate, and where the malfunctioning of any of which leads to overall failure. The implementation of research developments does not always depend entirely on us. Sometimes it happens that an outstanding machine is not promoted because of a lack of balance in the assignments of the purchasing enterprises and the clients.

I will illustrate what I mean, in the following example. Prototypes of unique pumps, designed for the hydrotransport of ore concentrates have not yet been tested, since VNIIgidrotruboprovod [All-Union Scientific Research Institute of Hydraulic Pipelines], of USSR Mingazstroy [Ministry of Gas Industry Construction] have not readied any test stands on which to test them. But in point of fact, this pump was developed as part of a special program, in which one of the participants, VNIIgidromash [All-Union Scientific Research Institute of Hydraulic Machine-Building], worked as authorized, but the other, VNIIgidrotruboprovod, worked in self-isolation. And this was done with perfect impunity. Nonetheless, we order some new high-output slurry pumps on compressed deadlines for development and manufacture, even though we already know that evidently neither the client or the customer will manage to prepare themselves to set up the timely production or introduction of these pumps. I could cite a few more examples of orders, and, quite likely the preparations for introducing them, which were poorly thought out, but behind all these actions, there is obviously only the desire to give an account of the above instances.

The conclusion, I believe, is already obvious. USSR Gosplan and Goskomtehnika [possibly USSR State Committee on Technical Affairs] need to have a more pronounced effect on those ministries which disrupt the deadlines for completing the special-purpose programs, and at the same time keep new and improved equipment from being put into production.

I believe that the difficulties stemming from inefficient interdepartmental coordination of the scientific research work, and the production and introduction of new equipment are characteristic of many scientific research institutes and design bureaus. And that is all the more reason to overcome these difficulties in the near future, thereby clearing the way for speeding up the tempo of scientific and technical progress.

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BRIEFS

CONFERENCE ON LABOR-INTENSIVENESS REDUCTION--The All-Union Scientific and Technical Conference "The Problems of Reducing Power-Consumption in the Public Sector of Production" concluded on 21 November 1984 in Moscow. Reports were delivered at the plenary meeting by USSR Gosplan Chairman Nikolay Konstantinovich Baybakov, USSR Goskomefteprodukt [State Committee for the Supply of Petroleum Products] Chairman Talgat Zakirovich Khuramshin, USSR Gosstandart [State Committee for Standards] Deputy Chairman V. Shil'din, USSR Gosplan (Power and Electrification) Department Chief Artem Andreyevich Troitskiy and VNIKTEP [All-Union Scientific Research Institute of Complex Fuel and Energy Problems] Director Sergey Nikolayevich Yatrov. The reports were discussed in three sections: "Methodological Problems of Reducing the Power Consumption of the National Economy and the Sector", "Resources for Economizing Fuel and Power-Production Resources in National Economic Sectors" and "The Role of Scientific and Technical Progress in Reducing the Power Consumption of Public-Sector Production". Scientists from a number of scientific research institutions and ministerial and departmental workers took part in the work of the conference. [By L. Piksaykina] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 49, Dec 84 p 17] 12659

MINENERGO MINISTER DISCUSSES SECTOR--(TASS)--The development of the fuel-energy complex touches all aspects of the country's economic life. This sector's workers are taking an active role in putting the USSR's Power-Production Program into practice. The Program calls for a structural, technical and economic-organizational restructuring of the economy for the purpose of putting it over onto an intensive and energy-conserving path of development as quickly as possible. This was the subject of discussion at a ceremonial evening on the occasion of Power Production Day. The celebration took place 21 December in Moscow. Among those in the presidium were CPSU Central Committee Politburo Member-Candidate and CPSU Central Committee Secretary Vladimir Ivanovich Dolgikh, responsible CPSU Central Committee workers, a number of ministry and department directors, outstanding production workers, scientists, and public representatives of the capital. USSR Minister of Power and Electrification Petr Stepanovich Neporozhniy delivered a report on ways to accomplish the tasks set for the sector by the 26th CPSU Congress and successive Central Committee party plenums on the reserves which are coming into operation at power-production enterprises and construction projects. The sector's workers have assured everyone concerned that they will do everything in their power, and apply all their know-how and experience toward the successful carrying out of the assignments for the year and for the five-year plan period as a whole. [By an unnamed TASS correspondent] [Text] [Moscow IZVESTIYA in Russian 23 Dec 84 p 2] 12659

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